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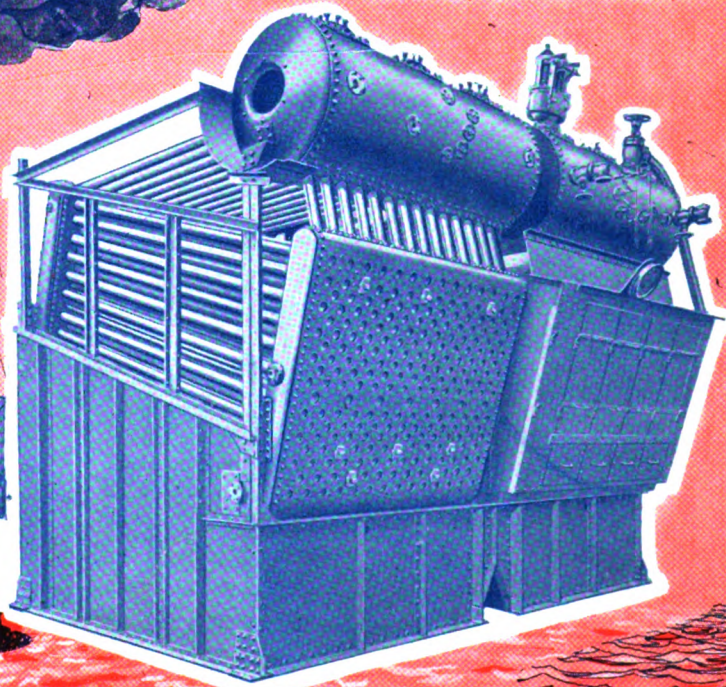
APRIL, 1920

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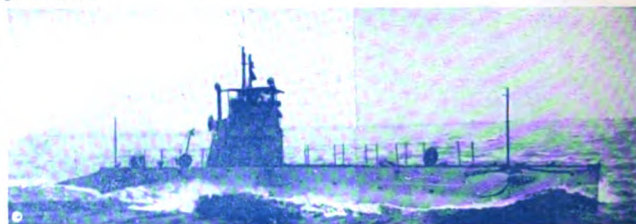
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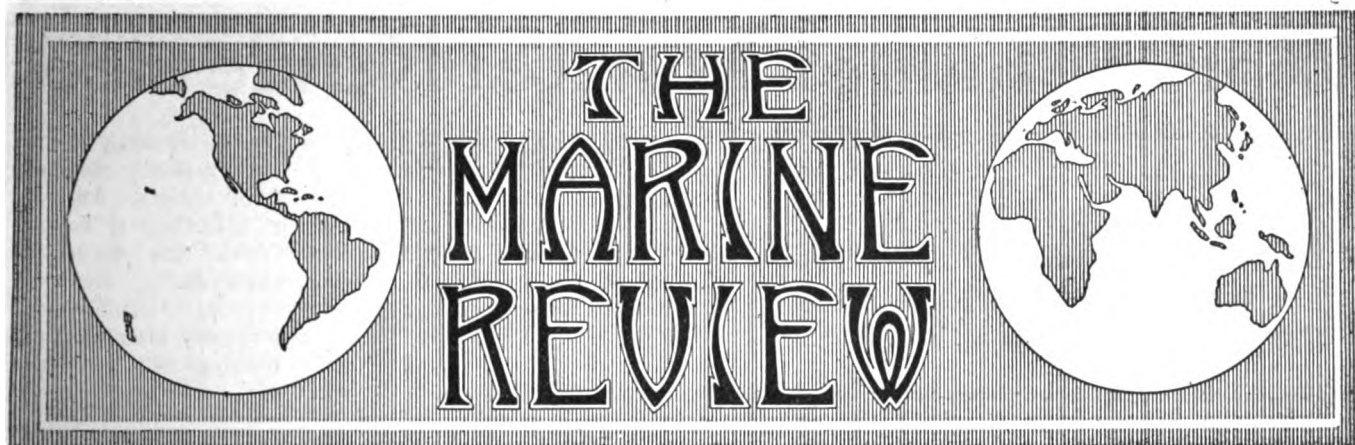
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VOL. 50

NEW YORK

APRIL, 1920

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No. 4

Propagandists Rule the Nation

Active Minority Gains Through Clamor Temporary Success in Blocking Merchant Marine Development — A Counter Irritant Needed

PROPAGANDA has the two-edged sword trait of lacerating with equal effectiveness both upon the inserting and withdrawal motion. This faculty is another of the immutable barriers of economic law which in the end always bring humanity from the devious by-paths of the theorists to the straight center road of common sense. In a time like the present when a clamorous minority gives turmoil a false appearance of strength and popularity, any form of propaganda wins a temporary success.

Losing a Fight by Winning

Reaction of the boomerang variety must already disturb the smug selfishness of those propagandists who are perfectly willing to sacrifice the American merchant marine to satisfy a hobby or grudge, or to test a delusion. In the case of the attempted sale of the ex-German passenger ships, a suspicion that an anti-British grudge was one impelling motive is justified by the record these active business baiters have built up. But the net result of their efforts so far has been to hold back American development while the British, among others, move forward.

Americans away from the debilitating atmosphere at Washington have slowly been learning that instead of the people or their elected representatives holding the governing power, the propagandists have been the real rulers. Like all mankind with new authority at their control, these aggressive promoters are losing ground through the abuse of their unaccustomed power. The case in favor of selling the German ships is so clear when stripped of the mist of half-truths that colored the issue in dark, sinister hues, that the reaction in public opinion will bring the issue to a definite settlement more quickly.

The ways of the propagandist are unknown to the ordinary citizen who has a conviction that somehow or other right will win out. If the results go against this citizen's convictions, he generally forgets the incident after making a few highly critical comments on the lack of ability of all legislators. Such citizens could learn from watching a genuine propagandist at

work in a conference on merchant marine policies held in Washington some months ago. He represented farmers although when pinned down he was not clear within a million or two either way just how many farmers sanctioned his representation. The farming community of the United States, he stated positively, was a unit for government ownership. They held this view for two fundamental reasons: Government operation of railroads was the greatest example of efficiency ever set in any enterprise in the world's history and the federal postoffice had lowered the price of carrying letters from 25 cents to 2 cents.

It seems almost absurd to continue the story which had its usual ending. Real representatives of farmers, men who were certain of the names of their organizations and the number and kind of their members, followed with more positive statements against government ownership than any shipowner uttered. With the typical courage of his breed, the propagandist was absent while these farmers were setting forth their views. The real point to observe was the almost brutal fashion in which this man, an opponent of the draft by the way, levelled his forefinger at a group of congressmen and threatened them with political death if they ran counter to his views.

An Expensive Cure for Theories

Why do not square acting and square thinking Americans take part more actively in helping legislators to a correct understanding of national sentiment? The arguments of the theorists in favor of government ownership of railroads have been knocked out by a 26 months' test—but at a fearful cost. In the same way a test of government ownership of vessels might in the long run strengthen a private merchant marine. To assume knowingly the full cost of this method is beyond reason. Some American shipping men are awake to the need of putting their views clearly before congress, but every recruit to the battle for a fuller discussion of merchant marine policies will bring success closer.

World Charter Market Reviewed by

RATES NORMAL

Shipping Conditions Are Expected to Clarify Soon with Keen Competition for Western Hemisphere Trade

SHIP operators have passed through a month of rapid development, the full significance of which is not yet defined. Conditions which the new American merchant marine must face are being disclosed. The fiasco in the sale of ex-German passenger ships has had a disturbing influence, particularly unfortunate since the bidding for these vessels disclosed a confidence which many had doubted. Congressional delay in establishing a policy and uncertainty over the real attitude of the administration on private ownership is handicapping the efforts of American ship operators to maintain their war-given rank in world shipping. Developments in the past few weeks indicate clearly that competition between American and foreign vessels is becoming active.

Vessels available for both prompt and future loading have been offered freely with the result that rates have been barely maintained. About 500 ships were idle in the port of New York last month. Trade with the Orient has been active. River Plate shipping was tied up last month on account of a strike at Buenos Aires. The demand for sailing vessels has been limited, being restricted almost entirely for off-shore voyages, principally to and from West Indian ports. A number of sailing vessels have been chartered for the coastwise coal trade. The government's wooden ships have met with a slackening demand and the shipping board last month allocated some 60 vessels for the New England coal trade. Shipping in English ports has been congested. Reports from France indicate that the French are preparing to boycott American ships because this government refused to give France a credit. Shipping men have been interested in the reported negotiations with Russia.

Charter Market Inactive

The charter market is comparatively slack. A small steamer signed charters for six months at \$8, and another steamer was taken for one round trip to the West Indies for the same price. While these quotations do not show any reduction from the charters fixed the month previous, they do not show any strengthening. The demands of the coal trade, however, continued strong and fixtures were placed for both South America and Europe. Coal from Virginia to River Plate was quoted from \$13 to \$16 last month. A charter at \$10 to St. Lucia was reported, and other quotations on coal were \$15 to Pernambuco, \$15 to Rio de Janeiro, \$21.50 to French Atlantic and \$22.50 to Genoa. Charters taken on coal from Virginia to Italian ports were quoted anywhere from \$22.50 to \$26.50. Lumber from the gulf to River Plate was done for \$35, from Pensacola to Concepcion

the quotation was \$40 and a like price was named on lumber from Jacksonville to Spanish Atlantic. Nitrates from the west coast of South America to Atlantic ports was done for \$17.50, and linseed from Buenos Aires to New York was done for \$25.50. Among the charters fixed during the past month were some on kainite from Hamburg to Atlantic ports. The quotations from Hamburg to Norfolk was \$6 and from Hamburg to Charleston is was \$6.50.

The North Atlantic range has been generally quiet for grain at limitation rates on British account and private business in barley and oats has been confined to occasional parcels by the regular companies. West India sugar has continued to be shipped at 50s per ton to United Kingdom, and 135s to 140s was obtainable to the continent. Procuring of cargoes for the homeward voyage is said by steamship companies to have been much easier than for many months. This is said to be due to the fact that European countries are getting back on their feet and manufacturing as well as land tilling is getting into full swing. England, France, Germany and practically all the countries of northern Europe are steadily increasing their exports to the United States.

American Lines Expand

That American ships are transporting the larger share of American commerce today is a point beyond question. Exports continue to decline but satisfaction is found in the fact that imports are beginning to climb. Tonnage has been used in a lopsided manner but with an import tonnage more nearly equal to the export movement, ship space will be more efficiently utilized in the future.

With the sailing of the STEELMAKER, the Isthmian line initiated its service between New York and the West coast recently. The United States Steel Corp., which owns this line, is having 13 freighters built for the service.

Under the management of Norton, Lilly & Co. the Steel corporation will further extend its overseas shipping services. A line of regular cargo boats will be operated from Mobile to Rotterdam and from Mobile to the Far East. Services will be maintained regularly between North and South American ports. The Ward line has established a

Must Keep Contracts

THE fact that eastbound Pacific freights have been demoralized by surplus space being offered has proved a boomerang for Japanese shipbuilders holding contracts with the Emergency Fleet corporation. On the insistence of the builders, the contracts stipulated delivery at American instead of Japanese ports. At that time, owing to the war boom, eastbound freights were around \$50 a ton so that a large profit was anticipated from the initial voyages across the Pacific. Now rates have slumped to \$4 and \$5 a ton and the anticipated profit becomes an actual loss. The Fleet corporation insists that the contracts be carried out to the letter as originally specified.

Experts in This Country and Abroad

passenger and freight service between New York and Spanish ports. The Raporel line has established a passenger service between New York and Hayti, Virgin islands and the Windward islands. Several of the larger lines are planning to have new passenger ships built for their services. Among these are two passengers for the Red D line, two for Munson, and two for the New York and Porto Rico line. As yet nothing official has been announced regarding the runs into which these projected vessels are to be placed. The United Fruit Co. has ordered eight new steamers for the United States trade and has let contracts for six steamers to be used in the European trade.

The passenger service between New York and River Plate established by the shipping board with the MOCCASIN showed a considerable deficit for the first voyage, but the Munsons, who operate this line, have announced that the vessel will be continued in the service. The difficulty found on the first voyage was the lack of oil bunker space. The deficit arose chiefly because of the necessity of replenishing the oil bunkers in South America where the price of oil is extreme. The shipping board will allocate the MARTHA WASHINGTON to the Munsons for this service, the ship sailing about the end of March.

U. S. Seeks Oriental Trade

Further demand for tonnage to operate from the Atlantic coast to the Orient has developed and it is understood that the shipping board will establish a line of regular freighters from Philadelphia to ports of Japan, China and the Philippines. The remainder of the new ships to be delivered to the shipping board will be assigned to routes already occupied by government tonnage, it being the reputed intention of the shipping board not to embark upon any new lines. In the Orient the board is developing two "feeder services" with the Great Lakes type of steel ships.

New Steamship Lines

SINCE the beginning of the European war, 28 new steamship lines have established regular sailings out of New Orleans as follows: From New Orleans to Antwerp, 2; to Rotterdam, 1; Scandinavian ports, 1; Genoa, 1; Trieste, 1; Bremen, 1; Hamburg, 1; Barcelona, 1; Japanese ports, 5; Chinese ports, 2; Colombian ports, 1; Chile and Peru, 1; Ecuador, 1; Central American ports, 2; Mexico, 3; West Indies, 3; Windward Isles, 1. In addition to these lines, the board of commissioners of the port announces that with improved facilities lines can be obtained to the Levant, South Africa, Dutch East Indies, Philippines, Australia and India.

One group feeds the transpacific line of the Pacific Steamship Co. and the Pacific Mail line, with the terminus at Hong Kong. The board expects to make Manila a berth for feeder ships. The second group of Great Lakes ships will berth at Shanghai. They will collect freight at the various smaller ports along the coast of China and take it to Shanghai for

EXTENDS LINES

**American Shipping Firms Increase
Their Activities and Many Plan to
Open New Routes in the Near Future**

trans-shipment in vessels being operated by the Robert Dollar line which has already scheduled sailings from New York to the Orient.

Foreign shipping interests show considerable activity. The Lloyd Royal Belge purchased 10 steel steamers from the shipping board through the Anderson Overseas Corp. They are of the so-called lake type and will be used by the Belgian line in its Antwerp, Baltic and Spanish and Portuguese services. The Cunard line is starting a passenger and freight service between New York and Hamburg with the sailing of the SAXONIA. The Cunard will also open a freight service from Philadelphia to Antwerp, Glasgow and to east Mediterranean ports. This will be in addition to the services established some time ago by Cunard from Philadelphia to Bristol, London and Liverpool. The Royal Mail Steam Packet Co., London, is reputed to be planning a general freight service between Jamaica, Cuba, northern ports of Hayti and the Dominican republic, Porto Rico and the Virgin islands. France, which has been somewhat backward in her steamship developments, is said to be planning to exercise her option on the ex-German ships seized in South America which the Kerr line attempted to purchase recently.

The severe weather that has been experienced on the north Atlantic and especially at American Atlantic ports has been a serious detriment to shipping during the past month. Many steamers were tied up for a considerable time at the port of New York and out-bound freight was scarce.

Lumber Carriers in Demand

Vessels are in strong demand from all north Pacific ports. Business in the charter market is limited, however, owing to the scarcity of vessels. Lumber carriers, in particular, are required as there is an unusual call from all markets for forest products of Oregon and Washington.

Sailing vessels are being chartered far in advance for lumber and spot vessels are practically unobtainable. Few lumber ships remain to be completed on the Pacific coast and the small fleet of wooden hulls, purchased from the shipping board and converted into lumber freighters under sail, are offering but little relief.

Lumber freights have advanced slightly in some directions and as a whole the situation is firm. To South Africa rates are at the top level of \$57.50 per 1000 feet, the highest on record. Owing to a strong demand and the diversion of a number of carriers to other routes, coast rates on lumber have advanced 50 cents per 1000 and are now \$9 to San Francisco

and \$10.50 to southern California, this also being a record high level.

On the Oriental route, the situation is firm, insufficient space being available to care for the cargo offering for shipment to the Far East. Freight from the Orient are still greatly depressed, being as low as \$4 and \$5 per ton, which is scarcely more than ballast rates.

Flour Movement Grows

Millers of the Pacific northwest are beginning to develop foreign markets which have been seriously handicapped since the war began. Recently flour has been moving to the Philippines in quantities while China is also buying in limited amounts.

With steamship service in prospect to the Dutch East Indies and Cuba, millers are looking in those directions to extend their commerce. The quoted rate on flour to the United Kingdom/Continent is \$22 but space is limited in that direction. Indicating the level of next season's grain rates from this coast, vessels are being sought for barley from San Francisco to United Kingdom/Continent, July-August loading, at \$40 per ton.

The demand for lumber in the Orient continues unabated and shippers are so eager for space for this commodity that the rate has advanced from \$35 to \$40 and in some cases \$45 is being asked.

Open Route to Rubber Port

Inauguration of direct service to Singapore by shipping board vessels, under management of the Pacific Steamship Co., will take effect with the departure from Seattle of the steamship *ICONIUM* in April. The Singapore-Seattle route to Akron, O., has an advantage of two days over

San Francisco and Los Angeles, 13 days over New Orleans and is about on a par with the all-water route via New York.

Recent compilations show that there are now engaged in the Pacific lumber trade 426 American steamers, motorships and sailing vessels with a total carrying capacity of 480,475,000 feet as against 450 vessels of 429,703,000 feet on July 1, 1914. This increase in capacity is so slight that it affords no relief especially in view of the greatly increased demand for water carriers as compared with conditions six years ago. Japanese tonnage, which

withdrew in large numbers from the Pacific trade early last year, is now returning and these tramps are expected to help move surplus freight.

More Ships Assigned to Boston

In spite of the recent tie-up of transportation throughout New England which interfered with the movement of vessels from the port of Boston, shipping interests generally consider the port's immediate future to be unusually bright. During the past month, 13 vessels have been assigned to Boston shipping companies for management and operation, which fact alone indicates a marked increase in shipping activity. Cargo offerings are plentiful and available shipping space is the factor at present which limits the amount of export business. The C. H. Sprague & Sons Co. has received the *ST. ANTHONY*, 5000 tons, for Black sea general cargo, the *ROCKAWAY PARK* for coal between Hampton roads and Antwerp and the *LAKE FRAY*, 4160 tons for Black sea points.

Coal vessels have usually returned from Boston to Norfolk in ballast, but the necessity for getting large stocks of Egyptian cotton which were on hand at the docks in Boston to New Bedford, Mass., caused the *LAKE WORTH*, 3115 tons, after discharging her coal cargo to load cotton and put in at New Bedford on her way to Norfolk.

Boston's Exports Increase

The new line from Boston to Black sea ports, the only American line operated in that service, is proving successful and regular sailing are expected to continue. Export commodities include packing house products, steel plates, shapes and rails, nails, roofing paper, clothing and general merchandise. A recent sailing carried 4000 tons of steel rails consigned to the Rumanian government which country has also been a large buyer of bridge and other material to replace the damage done during the war. Much of this material has recently been obtained from Canada.

Exports to Scandinavian ports are increasing and include shoes, leather, machinery (particularly electrical machinery), molasses, horsemeat, and other packing house products and general merchandise. Imports from the Far East to Boston have fallen off somewhat and rates in consequence have declined.

British Bunker Situation is Serious

(From Our European Correspondent)

LONDON, March 10. — (By Cable). — But moderate interest is being taken in the charter market, demand for cargo tonnage being light. The situation on the North Atlantic is easy. Competition from American ships is being felt here. The United States shipping board has established offices in Hamburg at which port 65 American vessels entered during February compared with only five British ships. The government has relinquished control over maize tonnage but this has not had any immediate effect on River Plate charters. Licenses are being issued for coal from the United States only to tonnage ready for loading. The bunker situation is serious in all

United Kingdom ports as prices are continuing to advance. Spanish ore to Middlesbrough is now taking a rate of 39s. Heavy grain is moving out of the River Plate to continental ports while oats and linseed have taken up considerable tonnage to the United Kingdom. The demand for maize is only normal. Linseed is taking a rate of 200s for up-river loading and 192s 6d from Buenos Aires for early position to the United Kingdom. Neutral owners are asking 220s for heavy grain from Buenos Aires to Marseilles and Rotterdam. A number of steamers have been employed on British account at 65s up-river and 62s 6d down-river to the United Kingdom. River Plate rate to Italy is 115s.

Designs Ships for Shawmut Line

Merchant Shipbuilding Corp. to Build Sister Ships for Overseas Trade—Plans Disclose Typical American Architectural Practice

FULL benefit of the experience gained during the war by American shipbuilders and naval architects in producing freighters for economical operation under the American flag is expressed in the designs of the two new 10,500-ton ships which the Merchant Shipbuilding Corp. recently contracted to build for the Shawmut Steamship Co. These two sister ships are to be built at the Chester, Pa., yard of the Merchant organization. They are designed to log 13 knots. In respect to size and speed they meet the standards which many experienced ship-owners hold are the most economical for operation in the overseas trade. The steamers, designed by C. A. Ward Jr., naval architect of the Merchant Shipbuilding Corp., embody a number of the latest and most interesting features of American shipbuilding practice. As an American product, steamship people expect them to be excellent examples of the shipbuilder's art. The combination of fairly large size, relatively large cubic capacity, high speed and considerable radius of operation, with the latest type of cargo-handling gear and arrangement of holds for speedy loading and discharge, are all typical of the up-to-date American cargo liner. The ships are to be of the full shelter-deck type, with only the bridge, deckhouse in the

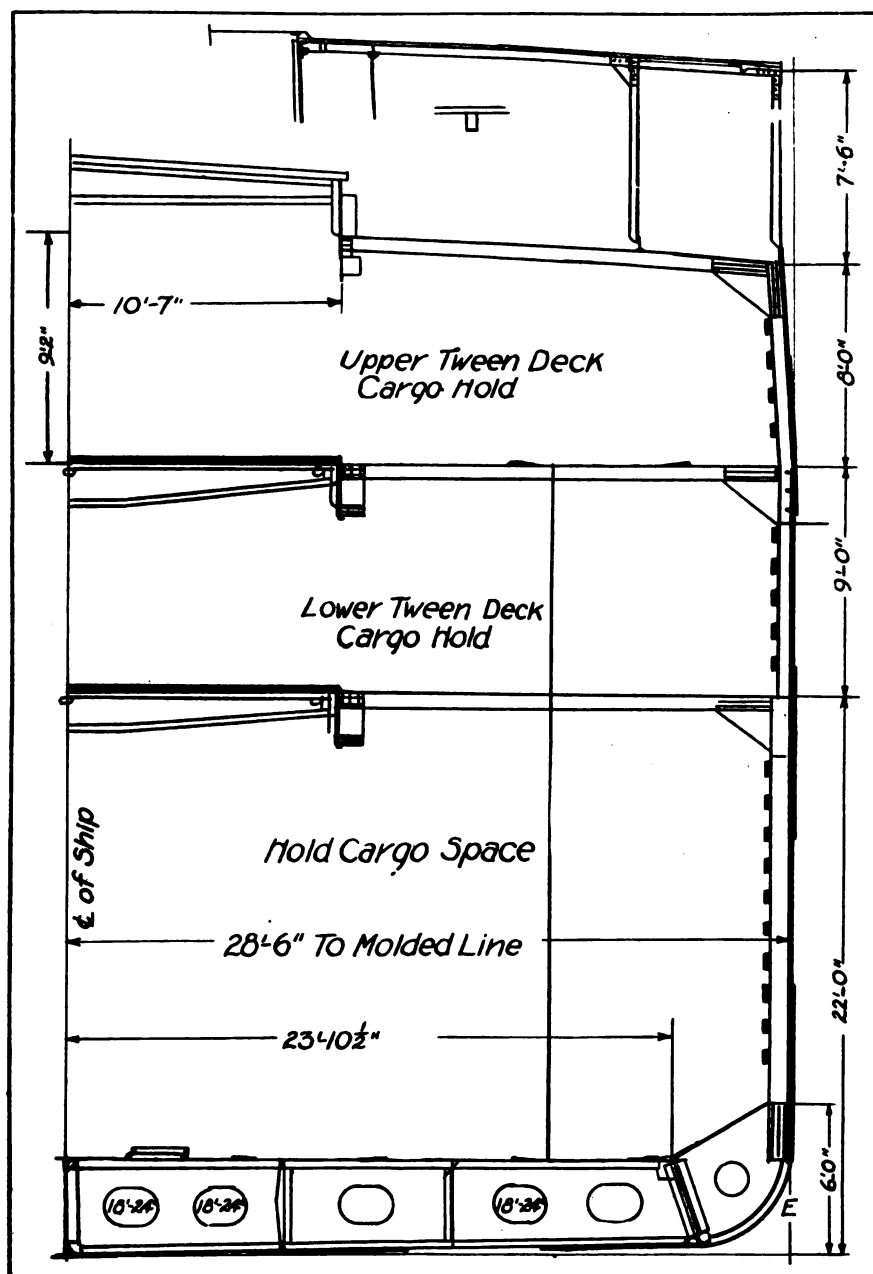
wake of the funnel, and another small house aft, breaking the full sweep of the upper deck, which is given a moderate sheer, accentuating the graceful lines of the vessel. The principal dimensions are length overall 457 feet, molded beam 57 feet, depth at side to shelter deck 39 feet, draft loaded 28 feet 9 inches. They will have 10,500 tons deadweight capacity, or 470,000 cubic feet cargo capacity.

An interesting feature of these ships is the propelling machinery, which is to consist of Westinghouse

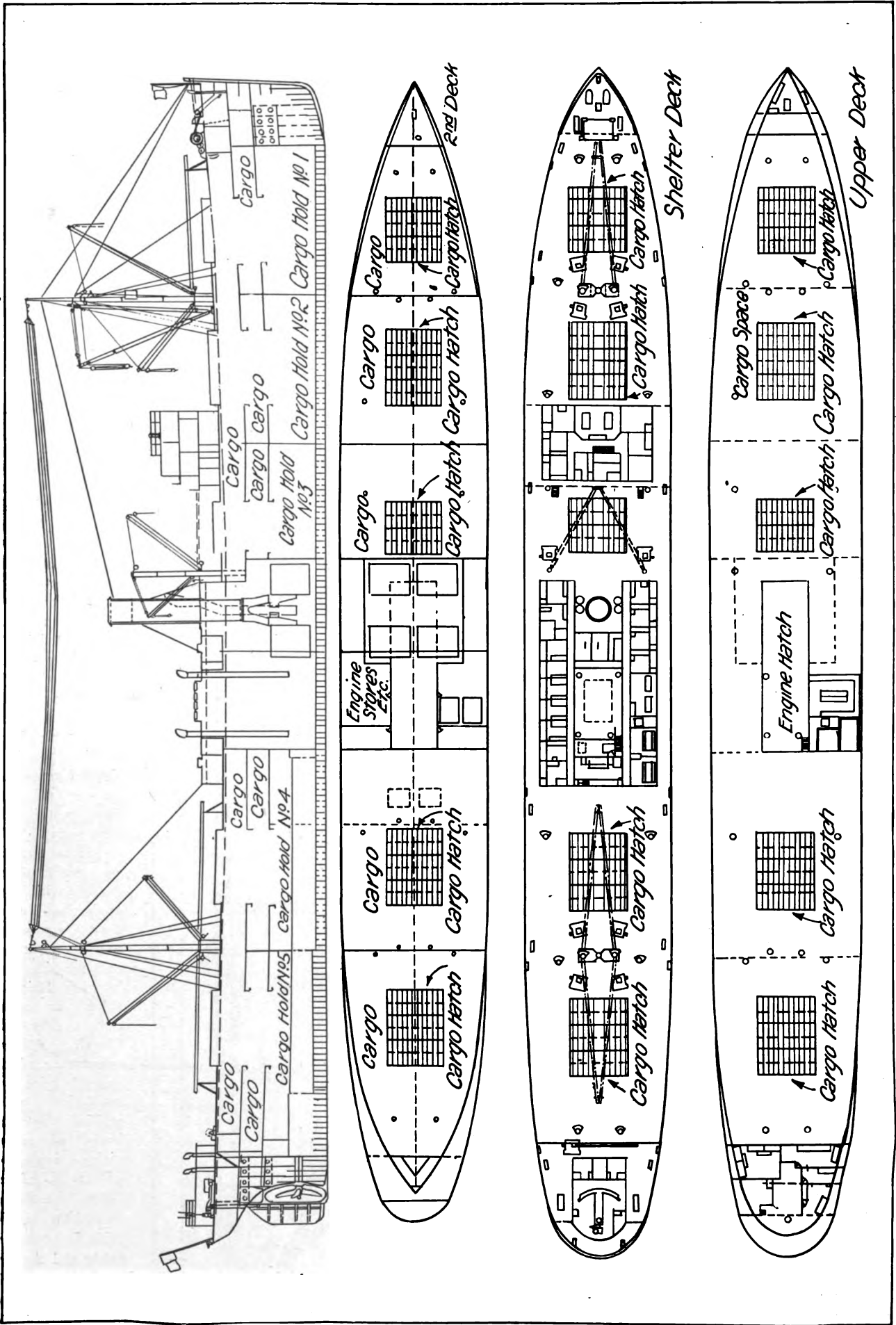
cross-compound geared turbines, capable of developing 4000 brake horsepower, when the main gear shaft is running at 90 revolutions per minute. The three other vessels of the Shawmut company, previously constructed at the Chester plant, are all turbine-driven. These vessels are the *SUDBURY*, *MYSTIC* and *IPSWICH*.

No announcement has been made by the Shawmut company as to the use to which these ships are to be put when completed. The three overseas vessels belonging to this company

are not now being operated in any fixed trade but are subject to charter. The clear presumption is, however, that they will find a berth in the Dutch East Indies or Levant service. The Shawmut company is operated by the Livermore - Dearborn-Harriman interests on the English system and some interesting maritime developments are expected from them within the next year. The contract specifies that the two new vessels with their engines, boilers and equipment, will be built under Lloyd's Register or Shipping special survey to class 100 A-1 Lloyd's. All requirements of the general rules and regulations prescribed by the board of supervising inspectors of the United States steamboat inspection service will be complied with, and the vessels will be officially measured and marked for



MIDSHIP SECTION SHOWING CARGO SPACE OF 10,500-TON FREIGHTERS



OUTBOARD PROFILE AND DECK PLANS SHOWING GENERAL ARRANGEMENT OF 10,500-TON FREIGHTERS BUILDING FOR THE SHAWMUT LINE

tonnage by a United States collector of customs. All certificates required by United States inspection will be obtained.

The vessels are to be steel, single screw type. Machinery will be amidships. The hull will have transverse framing. A tank top is to be fitted throughout from peak to peak bulkheads, the inner bottom tanks under the engine room being fitted for reserve feed water and the remainder for fuel oil. The peak tanks are to be fitted for ballast. Three of the cargo hatches will measure 29 feet 3 inches by 21 feet 2 inches. A fourth cargo hatch will measure 24 feet 9 inches by 21 feet 2 inches, and a fifth will measure 20 feet 3 inches by 21 feet 2 inches.

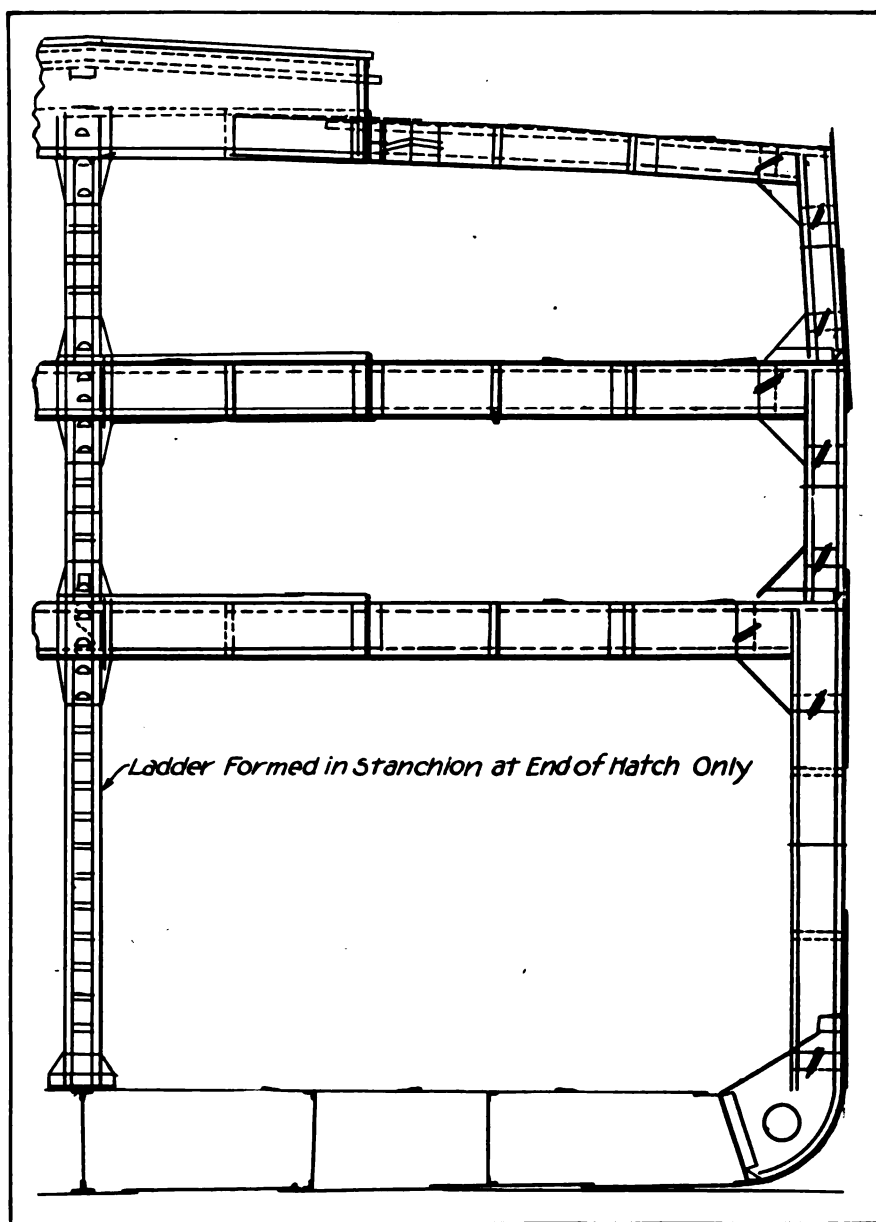
The vessels are to be flush decked. Officers, engineers, etc., will be quartered in steel houses on the shelter deck, the captain in a steel house on the boat deck, with a wooden wheel house and chartroom above. The firemen and seamen will be housed aft on the upper deck. A steel house will be fitted aft on the shelter deck for steering gear, entrance, toilets, etc. Two steel pole masts with wooden topmasts will be fitted for carrying cargo gear, lights, signals and radio antennae. Two steel kingposts will be fitted amidships. Ten 5-ton steel booms and one 30-ton steel boom will be installed.

The vessels will be arranged for burning fuel oil exclusively, and no arrangements will be made for burning or bunkering coal. They will have electric lighting plants, steam steering gear, steam spur geared windlass, steam warping winch, steam cargo winches and each will have one 2-ton refrigerating machine. Two fresh water tanks of a total capacity of about 7700 gallons will be located on the upper deck abreast the engine hatch.

The stern frame will be cast steel in two pieces, with scarfs at the upper part of the rudder post and lower part of the propeller post. No rudder stops are to be cast on the post, but chocks are to be provided for them at the rack. The rudder is to be of the single-plate type, with forged post, having forged arms opposite each pintle, shrunk on and keyed to the main piece. The rudder stock is to be forged steel, upper and lower stocks connected by vertical coupling with key and fitted bolts. The rudder will be so arranged that it may be shipped or unshipped while the vessel is afloat, without disturbing the upper stock. This feature expedites repairs.

The propeller will be 4-bladed, of manganese bronze and of the built-up type with a cast iron hub. The blades will be secured by steel collared studs and manganese bronze nuts with oval holes in the blades for adjusting for pitch. The hub is to be recessed over the end of the brass sleeve on the shaft. The propeller is to be of the best suitable form for economical speed and turning and to

on bulkhead, etc., for engine and boiler room floor plates; bath room, galley and miscellaneous fixtures; gasket angles, covers, etc., metal doors and covers; engine room and other metal skylights and covers; non-structural tanks; smokestack; uptakes in sections for shipping and unshipping; ventilator deck angles to vents; vent cowls, bulkheads, trunks, etc., not forming part of the strength



CROSS SECTION AT END OF HATCHES OF 10,500-TON FREIGHTERS

be so designed as to give the best results with the ship deep loaded and at contract speed.

Due recognition has been given to electric welding in the contract, it being agreed by the steamship company that the shipbuilders may electric weld instead of rivet certain parts, at the builders' option. The parts that may be electric-welded are gutter bars at oil bulkheads; clips and angles

members of the vessel; slop chute; sheet metal work in general when of black iron, and masts and king posts. Electric welding may be used in the main structural members only as approved by the classification society without prejudice to the vessel's unqualified classification.

An evidence of the advanced accommodations to be supplied the crews is recognized in the plans for

the galley equipment. Each ship galley is to be equipped with one range 8 feet long, with two fires and two ovens; one 40-gallon hot water boiler; one 2-compartment vegetable cooker with cast iron doors and galvanized perforated steaming baskets for each chamber. The pantry will have one combination steam table and plate warmer, and one 50-pound ice capacity refrigerator. The captain's cabin will be equipped with a brass bed. The 51 berths for the crew will be of steel tube frame construction, chilled joints, lee rails when standing clear of bulkhead, hangers of malleable iron. The berths are to be equipped with galvanized finish fabric with helical springs at each end and two such springs on each side. Twelve of these berths are to be white enamel finish and the remainder aluminum bronze.

How Turbines Are Arranged

The propulsion unit will consist of one set of turbines and reduction gears of the 2-cylinder, cross-compound type arranged so that either turbine can be operated ahead or astern independent of the other turbine. The double reduction will be in three independent gear boxes making practically a single reduction in each box. The helical gears will have true involute teeth with 32 teeth in a pinion. Kingsbury type thrust bearing will be integral with the reduction gears.

A lubricating oil pressure will be maintained by static head from gravity tank to bearings, thence it will drain by gravity to a sump tank of about 600 gallons capacity, located under the engine floor. The oil pumps will draw from the sump tank and discharge oil through either or both coolers to the gravity tank, thus maintaining a constant oil circulation. An oil filter or purifier will be by-passed in the system for taking a portion of the oil at a time for filtering.

The shaft will be made up of seven pieces, 14¾ inches diameter with couplings forged on and fitted with eight tapered coupling bolts with nuts on the forward side only. Each section of the shaft will be supported by two cast iron bearings, the lower half of which will be fitted with bab-bitted surface, suitably lubricated. The propeller shaft will be 16¼ inches diameter with coupling forged on forward end and aft end tapered and threaded for propeller and nut. A bronze sleeve will be shrunk on the propeller shaft and pinned to the shaft by ¾-inch headless screws riveted

over. One 6-inch fuel oil filling pipe will be provided on each side of the ship for each tank or settling tank. An equalizer pipe will be fitted athwartships between the side tanks. The double bottom fuel tanks will be filled by gravity through the transfer lines from the side tanks. Two fuel oil service pumps of the horizontal duplex double acting type will discharge through the fuel oil heaters and strainer to the burners. An overboard connection will be made from the discharge line back to the suction to enable the engineer to circulate the oil before starting the fires. Steam heater coils will be fitted around the suction in all the fuel oil tanks. The two oil heaters will each have a capacity of 5000 pounds of 14 degree beaume fuel oil per hour to be heated from 90 to 250 degrees. One duplex basket type fuel oil suction strainer and one duplex basket fuel oil discharge strainer will be provided. The discharge strainer will have screw connections and the suction strainer flange connections with proper cross-connection valves, so that either strainer may be cleaned while the other is in operation.

Each vessel will have 12 oil burners of the mechanical atomizer type, and air registers complete for installing in Scotch boilers. The burners will have a total maximum capacity of 5000 pounds of fuel oil per hour. The four boilers will be of the single and Scotch marine type, about 15 feet 10 inches internal diameter by 12 feet over the heads. Each boiler will be constructed for 215 pounds working pressure, 325 pounds test pressure. The total heating surface of each boiler will be about 3100 square feet. Four superheaters will be provided, each superheater to handle 16,000 pounds of steam per hour at 215 pounds pressure. The boilers carry forced draft blowers.

Steering Gear Is Worm Driven

The steam steering gear will be of the steam tiller type. It will have a rack secured to the deck and double engines mounted on the tiller. The engines will drive through a worm gearing to a pinion which will engage the rack through a friction clutch. The engines will operate on 100 pounds of steam pressure and 5 pounds of back pressure. The control will be hydraulic telemotor with polished brass controlling wheel and stand in the pilot house, and steering engine room aft. A separate quadrant will be fitted on the rudder stock with rack on the outer edge, for hand gear. The hand wheel will operate

the quadrant through worm, worm wheel, clutch, and pinion similar to the steam gear. The steam gear will be capable of throwing the rudder hard over through 38 degrees at full speed or 13 knots. The hand gear will perform the same duty with four men at the wheel at two-thirds speed.

These vessels will carry the accepted equipment in the way of condensers, pumps, tools, parts, heaters, injectors, evaporator, etc. The electrical installation will consist of two 10-kilowatt, direct-current, generators for constant speed operation. Each will deliver a pressure of 125 volts at generator terminals at no load and full load. Both generators will be able to carry 25 per cent overload for two hours without excessive heating. Lighting fixtures in the living quarters will be fitted with open glass reflectors. A separate circuit will be installed for the running lights which will be connected from a switch on the main switchboard to a tell-tale panel conveniently located in the pilot house.

February Lake Levels

The United States lake survey reports the monthly mean stages of the Great Lakes for the month of February, 1920, as follows:

Lakes	Feet above mean sea level	
	Jan.	Feb.
Superior	602.08	601.91
Michigan - Huron	580.08	579.95
St. Clair.....	573.10	573.41
Erie	571.38	570.80
Ontario	245.31	245.01

Lake Superior is 0.17 foot lower than last month, 0.16 foot lower than a year ago, 0.09 foot above the average stage of February of the last 10 years.

Lakes Michigan-Huron are 0.13 foot lower than last month, 0.71 foot lower than a year ago, 0.01 foot above the average stage of February of the last 10 years.

Lake Erie is 0.58 foot lower than last month, 1.41 feet lower than a year ago, 0.80 foot below the average stage of February of the last 10 years, 2.95 feet below the high stage of February, 1863, and 0.17 foot above the low stage of February, 1902.

Lake Ontario is 0.30 foot lower than last month, 0.90 foot lower than a year ago, 0.47 foot below the average stage of February of the last 10 years, 2.66 feet below the high stage of February, 1886, and 1.18 feet above the low stage of February, 1897. During the last 10 years the February level has averaged 0.10 foot higher than the January level, and 0.2 foot lower than the March level.

What Export Trade Terms Mean

Various Expressions Generally Confusing to the Layman Are Described in Detail—Definitions Have Been Standardized to Remove Uncertainty

FOR the simplification of foreign sales contracts, fixed definitions of export quotations have been promulgated by the National Foreign Trade council, New York. These definitions have been approved by the Chamber of Commerce of the United States, National Association of Manufacturers, American Manufacturers' Export association, Philadelphia Commercial museum, American Exporters' and Importers' association, Chamber of Commerce of the State of New York, New York Produce exchange and New York Merchants' association.

The common abbreviations adopted are f.o.b., meaning free on board; f.a.s., free alongside ship; c.&f., cost and freight; c.i.f., cost, insurance and freight; l.c.l., less than carload lot.

The following, in their order, are the normal situations in which an export manufacturer or shipper may desire to quote prices. It is to be understood that unless a particular railroad is specified, the property will be delivered to the carrier most conveniently located to the shipper. If the buyer, for the purpose of delivery, or in order to obtain lower transportation charges, desires that the goods be delivered to a carrier further removed from the shipper and entailing a greater cost than delivery to the carrier most favorably situated, the carrier to which the buyer desires delivery of the goods should be named in the quotations. The term "cars or lighters" as used in the definitions, is intended to include river, lake or coastwise ships, canal boats, barges or other means of transportation, when so specified in the quotation.

1.—When the price quoted applies only at shipping point and the seller merely undertakes to load the goods on or in cars or lighters furnished by the railroad company serving the industry, or most conveniently located to the industry, without other designation as to routing, the proper term is:

F.O.B. (named point)

Under this quotation:

A. Seller must

- (1) place goods on or in cars or lighters.
- (2) secure railroad bill of lading,
- (3) be responsible for loss and/or damage until goods have been placed in or on cars or lighters at shipping point, and clean bill of lading has

been furnished by the railroad company.

B. Buyer must

- (1) be responsible for loss and/or damage incurred thereafter,
- (2) pay all transportation charges including taxes, if any,
- (3) handle all subsequent movement of the goods.

2. When the seller quotes a price including transportation charges to the port of exportation without assuming responsibility for the goods after obtaining a clean bill of lading at point of origin, the proper term is: F.O.B. (named point) freight prepaid to (named point on the seaboard).

Under this quotation:

A. Seller must

- (1) place goods on or in cars or lighters,
- (2) secure railroad bill of lading,
- (3) pay freight to named port,
- (4) be responsible for loss and/or damage until goods have been placed in or on cars or lighters at shipping point, and clean bill of lading has been furnished by the railroad company.

B. Buyer must

- (1) be responsible for loss and/or damage incurred thereafter,
- (2) handle all subsequent movement of the goods,
- (3) unload goods from cars,
- (4) transport goods to vessel,
- (5) pay all demurrage and/or storage charges,
- (6) arrange for storage in warehouse or on wharf where necessary.

3. Where the seller wishes to quote a price, from which the buyer may deduct the cost of transportation to a given point, without the seller assuming responsibility for the goods after obtaining a clean bill of lading at point of origin, the proper term is:

F.O.B. (named point) freight allowed to (named point on the seaboard).

Under this quotation:

A. Seller must

- (1) place goods on or in cars or lighters,
- (2) be responsible for loss and/or damage until goods have been placed in or on cars or lighters at shipping point, and clean bill of lading has been furnished by the railroad company.

B. Buyers must

- (1) be responsible for loss and/or damage incurred thereafter,
- (2) Pay a full transportation charges (buyer is then en-

titled to deduct from the amount of the invoice the freight paid from primary point to named port),

- (3) handle all subsequent movement of the goods,
- (4) unload goods from cars,
- (5) transport goods to vessel,
- (6) pay all demurrage and/or storage charges,
- (7) arrange for storage in warehouse or on wharf where necessary.

4. The seller may desire to quote a price covering the transportation of the goods to seaboard, assuming responsibility for loss and/or damage up to that point. In this case, the proper term is:

F.O.B. cars (named point on seaboard).

Under this quotation:

A. Seller must

- (1) place goods on or in cars,
- (2) secure railroad bill of lading,
- (3) pay all freight charges from point of shipment to port on seaboard,
- (4) be responsible for loss and/or damage until goods have arrived in or on cars at the named port.

B. Buyer must

- (1) be responsible for loss and/or damage incurred thereafter,
- (2) unload goods from cars,
- (3) handle all subsequent movement of goods,
- (4) transport goods to vessel,
- (5) pay all demurrage and/or storage charges,
- (6) arrange for storage in warehouse or on wharf where necessary.

5. It may be that the goods, on which a price is quoted covering the transportation of the goods to the seaboard, constitute less than a carload lot. In this case, the proper term is:

F.O.B. cars (named port) L.C.L

Under this quotation:

A. Seller must

- (1) deliver goods to the initial carrier,
- (2) secure railroad bill of lading,
- (3) pay all freight charges from point of shipment to port on seaboard,
- (4) be responsible for loss and/or damage until goods have arrived on cars at the named port.

B. Buyer must

- (1) be responsible for loss and/or damage incurred thereafter,
- (2) handle all subsequent movement of the goods,
- (3) accept goods from the carrier.

- (4) transport goods to vessel,
- (5) pay all storage charges,
- (6) arrange for storage in warehouse or on wharf where necessary.

6. Seller may quote a price which will include the expense of transportation of the goods by rail to the seaboard, including lighterage. In this case, the proper term is:

F.O.B. cars (named port) lighterage free.

Under this quotation:

A. Seller must

- (1) place goods on or in cars,
- (2) secure railroad bill of lading,
- (3) pay all transportation charges to, including lighterage at, the port named,
- (4) be responsible for loss and/or damage until goods have arrived on cars at the named port.

B. Buyers must

- (1) be responsible for loss and/or damage incurred thereafter,
- (2) handle all subsequent movement of the goods,
- (3) take out the insurance necessary to the safety of the goods after arrival on the cars,
- (4) pay the cost of hoisting goods into vessel where weight of goods is too great for ship's tackle,
- (5) pay all demurrage and other charges, except lighterage charges.

7. The seller may desire to quote a price covering delivery of the goods alongside overseas vessel and within reach of its loading tackle. In this case, the proper term is:

F.A.S. vessel (named port).

Under this quotation:

A. Seller must

- (1) transport goods to seaboard,
- (2) store goods in warehouse or on wharf if necessary, unless buyer's obligation includes provision of shipping facilities,
- (3) place goods alongside vessel either in a lighter or on the wharf,
- (4) be responsible for loss and/or damage until goods have been delivered alongside the ship or on wharf.

B. Buyer must

- (1) be responsible for loss and/or damage thereafter, and for insurance,
- (2) handle all subsequent movement of the goods,
- (3) pay cost of hoisting goods into vessel where weight of goods is too great for ship's tackle.

8. The seller may desire to quote a price covering all expenses up to and including delivery of the goods upon the overseas vessel at a named port. In this case, the proper term is:

F.O.B. vessel (named port).

Under this quotation:

A. Seller must

- (1) meet all charges incurred

in placing goods actually on board the vessel,

- (2) be responsible for all loss and/or damage until goods have been placed on board the vessel.

B. Buyer must

- (1) be responsible for loss and/or damage thereafter,
- (2) handle all subsequent movement of the goods.

9. The seller may be ready to go farther than the delivery of his goods upon the overseas vessel and be willing to pay transportation to a foreign point of delivery. In this case, the proper term is:

C. & F. (named foreign port).

Under this quotation:

A. Seller must

- (1) make freight contract and pay transportation charges sufficient to carry the goods to agreed destination,
- (2) deliver to buyer or his agent proper bills of lading to the agreed destination,
- (3) be responsible for loss and/or damage until goods have been delivered alongside the ship and clean ocean bill of lading obtained (seller is not responsible for delivery of goods at destination).

B. Buyer must

- (1) be responsible for loss and/or damage thereafter and must take out all necessary insurance,
- (2) handle all subsequent movement of the goods,
- (3) pay costs of discharge, lighterage and lading at foreign port of destination in accordance with bill of lading clauses,
- (4) pay foreign customs duties and wharfage charges.

10. The seller may desire to quote a price covering the cost of the goods, the marine insurance on the goods, and all transportation charges to the foreign point of delivery. In this case, the proper term is:

C.I.F. (named foreign port).

Under this quotation:

A. Seller must

- (1) make freight contract and pay freight charges sufficient to carry goods to agreed destination,
- (2) take out and pay for necessary marine insurance,
- (3) be responsible for loss and/or damage until goods have been delivered alongside the ship, and clean ocean bill of lading and insurance policy have been delivered to the buyer, or his agent (seller is not responsible for the delivery of goods at destination, nor for payment by the underwriters of insurance claims),
- (4) provide war risk insurance, where necessary, for buyer's account.

B. Buyer must

- (1) be responsible for loss and/or damage thereafter, and must make all claims to which

he may be entitled under the insurance directly on the underwriters,

- (2) pay costs of discharge, lighterage and lading at foreign port of destination,
- (3) pay foreign customs duties and wharfage charges.

New Shipping Firms

During February, 17 new shipping companies with an aggregate capital of \$33,380,000 were formed, according to figures recently compiled by the *New York Journal of Commerce*. This represents a decline from the activity shown in January when 32 concerns with capital aggregating \$76,350,000 were organized.

Three of the 17 firms formed in February will engage in shipbuilding and ship repair work. The aggregate capital of these three concerns is \$13,500,000, which is a larger proportion of the total indicated investment than has been credited to this branch of the shipping industry for some months.

The list of companies formed in February, the state in which they are incorporated and the amount of their capitalization follows:

FEBRUARY, 1920

Bermudez Transport Co., Del.....	\$ 600,000
Compania Maritima Dominicana, Inc., Del.	800,000
Consolidated Steamship Lines, Inc., Del...	10,000,000
Five-Continent Steamship Co., N. Y.....	50,000
Federal Navigation Co., Del.....	100,000
Globe Shipbuilding & Dry Docks Co., Md.	5,000,000
General Transportation & Stevedoring Co., Del.	50,000
Independent Towboat Co., Del.....	100,000
Lawton Trading Corp., N. J.....	50,000
Lavino Shipping Co., Del.....	1,000,000
Mears Towing Co., N. Y.....	50,000
New York Harbor Dry Dock Corp., Del....	8,000,000
Osage Steamship Co., Ltd., Del.....	1,000,000
Pan Union Steamship Corp., Del.....	1,000,000
Phillips Navigation Co., N. Y.....	80,000
Republic Navigation Co., Del.....	5,000,000
Rice Bros. Corp., Me.....	500,000

Total\$33,380,000

Trade Council to Meet

The seventh national foreign trade convention of the National Foreign Trade council will be held in San Francisco, May 12-15. The preliminary program drawn up by the council includes plans for a thorough discussion of the foreign trade problems of the United States, especially with a view to formulating a foreign trade program for legislative, executive and industrial action during 1920 and 1921. James A. Farrell, president of the United States Steel Corp., is chairman of the council.

Officials of the Todd Shipyards Corp. recently denied that there was any foundation for the published report that Todd Dry Docks, Inc., had contemplated the purchase of the plant of the Alabama Dry Dock & Shipbuilding Corp., Mobile, Ala.

To Train Shipyard Apprentices

American Shipbuilders Are Taking Steps to Restore Methods for Technical Training of Apprentices—Uniformity of Schooling Systems is Planned

BY V. G. IDEN

GREEN help can be trained into skilled workmen in several ways.

One is the training school method adopted during the war. Another is the old system of helpers prevalent in the shipyards prior to the war. The new method which is being adopted on the Atlantic coast is the apprenticeship. This last named is an adaptation of the best points of all previous methods. Not all the eastern yards have the apprenticeship scheme, some holding to the helper plan. But it happens that a helper is paid at a rate of 54 cents per hour, whereas an apprentice is paid much less. It is reasonable to expect that one or the other must be abandoned, or such discrepancy in the wages paid different classes of men doing practically the same work will cause trouble. As a temporary expedient, the Delaware river shipyards agreed that helpers or laborers under the age of 19 years shall not be hired in yards where apprenticeship systems are in effect.

This is an important point in the whole scheme as will readily be seen when the basic principles of apprenticeship as adopted by the eastern shipyards are studied.

At the mid-December, 1919, meeting of the Delaware river section of the Atlantic Coast Shipbuilders' association, it was agreed that five basic principles as regards apprenticeship should prevail. The companies repre-

sented at that meeting were the Sun Shipbuilding Co.; William Cramp & Sons Ship & Engine Building Co.; New York Shipbuilding Corp.; Bethlehem Shipbuilding Corp., Harlan plant; Merchant Shipbuilding Corp., Harriman yard; Merchant Shipbuilding Co., Chester yard; American International Shipbuilding Corp.; Pusey & Jones Co., Gloucester, N. J.; Pusey & Jones Co., Wilmington, Del., and the Emergency Fleet corporation. The principles provided as follows:

- 1-That four years constitute the period of apprenticeship training but a system of credits be allowed for attendance, adaptability, conduct, night school studies, etc., provided the aggregate of such credits shall not exceed one year.
- 2-That a minimum age at which apprentices may be accepted be 16 years.
- 3-That the average yearly rates of pay during the apprenticeship period be as follows:
First year, 37½ per cent; second year, 50 per cent; third year, 62½ per cent, and fourth year, 75 per cent,



CLASS OF APPRENTICES AT THE HARLAN AND HOLLINGSWORTH YARD



FUTURE SHIPBUILDERS—THESE APPRENTICES ARE RECEIVING PRACTICAL TRAINING

these percentages to be based on the current journeyman rate.

4—That the same basis of pay to journeymen for overtime apply to apprentices.

5—That upon satisfactorily completing his course the apprentice be given a bonus of \$100 and a suitable certificate signed by the company and bearing his name.

These basic principles were recommended by a committee composed of G. H. Kochersperger of Cramps, H. C. Towle of New York Ship, C. W. Weaver of the Harlan yard, J. K. Graham of the Sun yard, and Joseph S. Stull Jr. of the Gloucester yard of Pusey & Jones.

The apprenticeship system which the eastern yards are adopting is different from the old training school method the shipping board fostered during the war. The training schools were not entirely wrong and some of them showed excellent results. The New York Shipbuilding Corp., for instance, has a shipfitters' school in which 450 men had enrolled up to last December. Of that number 81 per cent had remained with the corporation. The school had then been in existence two years and among its graduates employed in the yard was one foreman, one assistant foreman, three subforemen, 12 leaders, 10 working leaders and two instructors. This system of training, however, it is felt, will ultimately be supplanted by the apprenticeship system.

Although the concerted action of the Delaware river shipbuilders was not promulgated until late in December, some individual yards had then already made progress with the establishment of apprenticeship systems of their own. The Cramp yard, the Harlan plant, and the Sun company had well defined systems in practice. A plan introduced in the yard of the New York Shipbuilding Co. was undergoing changes; the Chester yard of the Merchant Shipbuilding Corp. was working out a system, and the Gloucester and Wilmington yards of Pusey & Jones had proposed to establish systems. The Harriman yard of the Merchant Shipbuilding Corp. introduced an apprenticeship system which was abandoned on Oct. 15, 1918, on orders of the Emergency Fleet corporation which took the position that government work at that yard would not be of sufficient duration to justify entering into an agreement with prospective apprentices.

An effort was immediately made to interest the shipbuilders in other sections in this subject. The apprenticeship program was placed before the New England and the New York sections of the association. Conditions

differ materially in the various yards and a plan which might prove successful in one yard could not be satisfactorily applied to another, but it has been agreed that uniformity is both desirable and necessary as a basis for each apprenticeship system while the individual yard should be permitted to work out the details of its training course as local conditions warrant.

Uses System of Credits

A canvass of the various yards in the Delaware river section showed that with the exception of the Harlan plant, which has a 3-year course, all

other yards having similar systems require their apprentices to devote four years to training. It was found that in some yards a system of credits was used which could be applied in a way to reduce materially the length of time an apprentice is required to serve. This feature of the system seems to be generally approved.

Success of the system demands that the highest possible ratings consistent with good managerial practice should be adopted if a shipyard seeks to attract a sufficient number of apprentices to meet its requirements. There is also the moral obligation of giving an apprentice at the start a rate of

BETHLEHEM SHIPBUILDING CORPORATION, LTD.

PLANT

APPRENTICESHIP AGREEMENT

THIS AGREEMENT, made this _____ day of _____ A.D. _____

by and between the BETHLEHEM SHIPBUILDING CORPORATION, LTD.,
PLANT _____ WORKS, a corporation established in the City of Bethlehem, in the State of Pennsylvania, party of the first part, and
of _____ party of the second part.

WITNESSETH:

THAT WHEREAS the party of the second part is desirous of becoming an apprentice to the party of the first part, for the purpose of acquiring the art or trade of _____

That the party of the first part, in consideration of the covenants herein contained, hereby accepts the party of the second part as an apprentice in the art or trade of _____

subject to and in accordance with the "Terms of Apprenticeship" which are attached to this Agreement and made part thereof.

The party of the second part, in consideration of such acceptance, hereby agrees to become the Apprentice of the party of the first part in the _____ art or trade, in accordance with the said "Terms of Apprenticeship" and to faithfully conform to the provisions thereof.

The party of the first part covenants and promises to teach and instruct or cause to be taught and instructed the party of the second part in the art or trade of _____ during the term of apprenticeship.

The party of the first part through its agents or servants reserves the right to specify a course of training which shall enable the party of the second part to better and more creditably complete the terms of this agreement.

The party of the first part reserves the right in its sole discretion, to terminate the apprenticeship and to discharge said apprentice from its employ, and terminate and annul this indenture if in its judgment, or if in the judgment of its agents or servants, the party of the second part shall prove incompetent in said art or trade, or if in the judgment of the said party of the first part, or in the judgment of its agents or servants, the said party of the second part shall be guilty of immoral conduct or of repeated absence without leave, or of neglect of duty, or of disobedience to the rules and regulations of said party of the first part, or of disobedience to orders, or of improper conduct within or without the shops of said party of the first part.

The party of the first part covenants and agrees, in case the party of the second part shall serve the full term of said apprenticeship (including the making up of lost time), as provided in said "Terms of Apprenticeship," and shall in all respects comply with the provisions of said "Terms of Apprenticeship," to pay to the party of the second part, at the termination of said "Terms of Apprenticeship," in consideration of such faithful service, the sum of _____ and in addition whatever sum or sums may have been paid to the party of the first part as compensation during the term of apprenticeship.

If the party of the first part terminates the apprenticeship prior to the full time fixed for its duration, whether such expiration shall result from mutual cancellation of contract, from death or from other causes unforeseen, not involving a discharge of the party of the second part for cause, there shall be paid to him at such earlier termination of the apprenticeship such proportion of said above named final sum as the time of service elapsed shall bear to the total time contemplated.

In case of the termination of the apprenticeship by reason of the discharge of the second party for any of the causes above specified, no portion of said final sum shall be payable to him (and he shall not be employed in any other Department in the Yard without the consent of the party of the first part through its agents or servants).

IN WITNESS WHEREOF, the parties hereto have hereunto set their hands and seals, the day and year first above written.

I sign by way of expressing my consent _____

Apprentice

Parent or Guardian

Sworn to and subscribed before me this _____

day of _____ 19 _____

BETHLEHEM SHIPBUILDING CORPORATION, LTD.

Notary Public.

Per _____

My Commission Expires _____

This is to certify that _____ has served his full term of apprenticeship according to the above Indenture.

BETHLEHEM SHIPBUILDING CORPORATION, LTD.

Date _____ Per _____

IN DUPLICATE

FORM OF APPRENTICESHIP AGREEMENT

pay that will at least actually cover his bare living expenses.

A comprehensive plan of apprenticeship training has been adopted by the Bethlehem Shipbuilding Corp. whereby binding agreements are entered into with the young men who wish to avail themselves of the training. How this plan works out at the Harlan plant of this company may be accepted as a good example of its results. This plant has no working agreement with any technical school, there being no technical or industrial school in the near vicinity. In Wilmington a co-operative course is conducted by the board of education for boys between the ages of 14 and 16, whereby it has been arranged with several manufacturing concerns for the boy to work two weeks and go to school two weeks. There are two groups of boys, one group working while the other is at school. On account of a strict rule, whereby the Bethlehem yards do not employ anyone under 16, the shipbuilding company is unable to co-operate with the board of education in these courses.

The Harlan plant, however, has worked out a method of overcoming this. It attempts to maintain sustained interest in the work on the part of the apprentice. It has been found here that schooling on the company's time is a great factor in maintaining the enthusiasm of the boys. All week long they see the practical end of their course and then on Saturday morning they are instructed and schooled in the theories back of their work in the shops and the yard. Being paid to go to school appeals to the boys and affords them refreshing and at the same time inspiring and instructive diversion. Foremen are advised to be in sympathy with the apprentices and to give the boys every encouragement and arrange as far as possible for them to participate in various phases of the shop work so that monotony of toil may not kill the apprentice's enthusiasm.

Credit for outside study stimulated application in such communities where night schools flourish and the shipyards have been advised to foster attendance in every way. This principle has been adopted by the great bulk of the shipyards. It has also been found advisable to handle apprentices as a separate department, one man's entire time being necessary for the efficient application of any system. The Harlan plant does not equip an apprentice with tools free as that is considered the wrong idea. The boy does not appreciate them. Where he

pays for tools himself, out of the bonus money which is due him upon completion of his course, he takes a certain pride in the possession, and hence is more careful with them. It instills an idea of responsibility and value—that is a desirable asset in the finished product.

Considers Practical Experience

In the Harlan yard, apprentice instructors are chosen for the various trades by considering their practical experience at the trades involved, and their technical ability. Instructors are also chosen to instruct the apprentices

in the classroom in the various subjects relating to their trade. Often a foreman in a large department will designate a subforeman or leading man to look after the interests of his apprentices. At this plant it is a practice to select apprentices for the drafting rooms by holding a competitive examination, open to those who have served two years of their time at some trade in the yard. An apprentice contract is signed after a period of probation of generally six months.

A weekly time report for each apprentice is received from the time

TERMS OF APPRENTICESHIP UNDER WHICH APPRENTICES ARE RECEIVED AT THE

BETHLEHEM SHIPBUILDING CORPORATION, LTD.

PLANT

1. No apprentice will be employed under sixteen years of age. They must be physically sound, of average height, of good moral character, and have received an education equivalent at least to that required for finishing the sixth grade at the public grammar schools of the City of

2. Applicants, when notified, shall report for examination, accompanied by parent or legal guardian, or with School Certificate, and if accepted, the applicant's name will be registered and due notice given when he will be required to commence work.

3. The first hours, probationary period, of service, shall constitute a term of trial. If the apprentice shall during this term prove satisfactory, and shall before the expiration thereof execute with the consent of his parents or guardian the attached agreement between the party of the first part and the party of the second part, his apprenticeship shall date from the beginning of this term of trial, and shall continue for the full term, unless sooner terminated.

4. Apprentices will be required to serve for a minimum term of three years, each year to consist of twenty-three hundred and eighty working hours. He shall make up all lost time at the rate of wages paid during said year, and no new year of service shall commence until he shall have worked a full twenty-three hundred and eighty working hours, which shall not include lost time or time charged against him the preceding year.

5. A rating shall be kept by each foreman and Apprentice Supervisor, and any apprentice receiving for efficiency, deportment and punctuality, an average of ninety-five per cent out of one hundred per cent, shall be allowed two weeks, with pay in each year, which may be deducted from his term of apprenticeship, or taken as a vacation.

6. The Company reserves the right, whenever the state of business demands it, to shorten the hours of labor or whenever for any reason it shall stop the works, to suspend apprentices (wholly or in part), and the making up of time shall be at the discretion of the Company.

7. The use of tobacco or spirituous liquors on the premises is strictly forbidden.

8. Apprentices will be paid for each hour of actual service (not including time allowed for recreation or time when work is suspended) the following wages:

First six months	35 per cent	of the first-class mechanics' wages
Second six months	40 " "	then in existence at the
Second year	45 " "	Plant of
Third year	50 " "	Bethlehem Shipbuilding Corp., Ltd.

If during the period of apprenticeship the rate of pay of first-class journeyman should be increased or decreased the rate of pay of apprentices in the same craft will be increased or decreased correspondingly to maintain the apprentice rates at the same fixed percentage of the journeyman rates.

If the Company shall terminate the apprenticeship during the time of trial, it will pay at the rate of cents per hour for the time worked.

9. The Company will pay each apprentice upon the completion of his course \$

10. Wages will be paid on the regular pay-days of the Company, as they may be established from time to time.

11. Graduation of the High Schools, well recommended by the Principal, or for having had previous experience, may have their term of Apprenticeship shortened at the discretion of the Company.

APPRENTICE APPLICATION.

Date.....

BETHLEHEM SHIPBUILDING CORPORATION, LTD.,

Plant.

Gentlemen:

I hereby make application to become a Apprentice.

Name.....Residence.....

Age.....years, on.....19.....

Signature of parent or guardian.....

Address.....

IN DUPLICATE

FORM OF APPRENTICESHIP APPLICATION

office and is recorded in the apprenticeship time books. The term of apprenticeship is three years at present and an apprentice year consists of 2380 working hours. A bonus of one hour is allowed for each full week and is given for night school attendance. As an apprentice reaches the end of his period a re-rate sheet is put through so that his new rate takes effect promptly as he begins his new year or period.

A foreman's quarterly apprentice report card is made out for each apprentice by his foreman and the card is placed on file in the apprentice office. The data concerning his ability, application, neatness, punctuality, etc., are transferred from this card to his efficiency shop record. An apprentice school report card is made out for each apprentice by the chief instructor of the apprentice school and the card is placed on file in the apprentice office. The data concerning his ability, etc., are transferred from this card to his efficiency school record. Evening classes are conducted at the yard from October to April inclusive. Courses are arranged for the special benefit of apprentices and the technical combined with the practical side of shipbuilding is taught from every angle. In the case of an apprentice attending 75 per cent of the sessions the number of hours spent in attendance on the school will be doubled and this credit will be deducted from the apprenticeship course and shorten it accordingly.

Receives Thorough Instruction

The apprenticeship school at the Harlan plant is in charge of the supervisor of apprentices under whom there is a chief instructor and four competent teachers who instruct the apprentices in mathematics, mechanics, physics, mechanical drawing, civics, industrial history, English and spelling. The apprentice begins with shop arithmetic, all the examples applying directly to his work in the shops, and gradually studying more difficult shop problems, which involve practical geometry, mechanics and strength of materials. In drawing, he is first taught to make free-hand sketches, with dimensions, then mechanical drawings of the various parts he is working on in the shops, and afterward taught to pick the various parts off the blueprints. In this way he becomes accustomed to drawings and learns to read them. The apprentice is also instructed in industrial history, English and civics, together with the spelling of practically all the terms and names of tools, parts, etc., he

will come in contact with during his apprenticeship course.

The company selects, for the hull, engineering, and electrical drafting rooms, each year, apprentices who show sufficient ability in the apprentice school in mechanical drawing and mathematics, and wish to become draftsmen. It also selects for the temporary service in its drafting rooms apprentices who have shown ability and wish to gain drafting experience.

Trades That Require Skill

Shipbuilding, marine engineering and steam turbine building require skill in many arts. As a general thing yards afford schooling for an angle-smith, blacksmith, boilermaker, bolter, ship carpenter, coppersmith, core-maker, draftsman, electrician, erector, ironworker, joiner, loftsmen, machinist, molder, painter, patternmaker, pipe-fitter, ship plumber, rigger, riveter, sheet iron worker, shipfitter and tin-smith. The Bethlehem Shipbuilding Corp. at its Harlan plant accepts apprentices for training in the following trades.

Blacksmith—Steel and iron, machine and general forging, hammer and hand work, tool dressing.

Coppersmith—Templates for bending and brazing copper pipes, building tanks and similar fittings from sheet copper.

Plumber and Steam Fitter—Laying out and installing on ships, bending and fitting in shop, piping for steam and exhaust, fresh and salt water and sanitary plumbing systems.

Sheet Metal Worker—Light metal work, making tanks of sheet iron and brass, wire mesh work, welding by gas.

Electrician—Installing lighting and power plants on ships, laying out and fitting conduit, wiring and fixtures for lights and power, repairing motors and other electrical equipment in shops.

Shipwright—Setting keel blocks and shores, stage building, launching, laying wood decks and foundations, mast and spar building.

Patternmaker—Making wood patterns for iron, steel and brass castings of all sizes and types.

Joiner—Interior woodwork on ships, shop and bench work on furniture, both hand and machine.

Machinist—Building and installing system steam turbines, engines and pumps; general machine work in steel, iron and brass on drills, planers, slotters, shapers, boring mills, lathes, etc.; laying out, erecting and testing.

Outside Machinist—Installation of hull auxiliaries, steering gear, windlass, tur-rcts, ammunition hoists, and guns on warships, elevators on shipboard. Also

machine shop work.

Painter—Painting, sign writing, hardwood finishing, all painting in connection with vessels.

Shipfitter—Laying out shop work on steel plates and bars, assembling and erecting on ship, marking, punching and furnace work.

Mold Loftsmen—Laying out on mold floor, making templates for universal work covering the hull of a vessel, including lines, framing, keels, decks, shell, bulkheads, etc.

Chipper and Caulker—Cutting steel plates and bars, making watertight structural parts of the ship, hand and air machine work.

Riveter—Heating and driving rivets, hand and air machine work.

Anglesmith—Bending, furnacing, welding and all structural blacksmith work.

Boilermaker—Laying out, fitting and erecting boilers, uptakes, smokestacks, gratings, ventilators, tanks, etc.

Hull Draftsmen—Drafting in connection with the design, construction, fabrication and erection of the hull and its related parts, and power plant equipment.

Shipyards in general have not adopted apprenticeship training but inasmuch as a contingency is possible, it has been agreed that it would be best to have the practices as nearly uniform as possible. The plan in vogue at the Harlan plant may not be suitable to the conditions which some other shipyards have to confront. There are state laws in some instances which must be observed and these are not always uniform.

Consider Union Rules

Union rules are sometimes brought into consideration. In some unions an employer is not allowed to engage more than one apprentice for every 20 workmen. The union rules, however, are not considered any grave drawback. If the shipyard employers employing union labor have any reasonable measure of support from labor unions, the apprenticeship system as proposed will work out to a great advantage of everyone concerned. In the same general districts and the same states uniformity is theoretically possible, but not always practical.

The Sun Shipbuilding Co. had an apprenticeship plan in use prior to the war, but this was disbanded after the Emergency Fleet corporation became active and the so-called Allen system of indenture training inaugurated. Now that the yard's supply of mechanics is up to requirements and it is simply a matter of caring for the future shipbuilders, the company has changed to an apprenticeship system.

The Sun yard accepts grammar school

graduates, in age from 16 to 20 years, and gives them a 3-year course of training. Each department of the yard cares for its own apprentices and those departments which are now offering opportunities to apprentices are the shipfitting, mold loft, forging and electrical departments. After serving three years, the apprentice is required to work six months before being given full journeyman rates. At the expiration of this period he received \$100 in bonus for completing his course.

In conjunction with the work performed by the apprentices a special course in blueprint reading, laying-out and shop arithmetic has been arranged to help the apprentice. In the event that an apprentice is accepted who has not received sufficient educational training at the time of entering his apprenticeship he has the option of attending the Chester evening schools or the special course of instructions. In either case he has to cover this work in the first year of his apprenticeship.

During the apprenticeship lectures are given to the boys on some specific

subjects. This is done on Saturday afternoon and generally by the head of some department. These lectures may comprise a trip over the hulls under construction or through the shops, describing different operations that the plates and shapes will require during the process of fabrication. One hour is devoted to this work.

No tools or machines are set aside for the use of the apprentice. The work they do is carried on in conjunction with the regular productive force. By this means the apprentice is always in touch with men who give him the idea necessary to carry him through to the finish. The department head is directly in charge of the apprentice and he outlines his own course and keeps his own records of the apprentices in his department.

The plans followed by the Sun and the Harlan yards are in accord with the five basic principles adopted by the Delaware river shipbuilders, but the one differs from the other according to the requirements of the individual yard. A movement is on foot to co-ordinate the yard systems to a

further extent. It is argued that uniformity should be worked out in greater detail. For instance, one proposition made to the shipbuilders in the New York district was that the length of the terms of training in each step of the work should be regulated by uniform rules. A boy binding himself to be trained as a machinist should be assigned the first three months to the drill presses, the next four months to shapers and planers, four months to lathes, four months to milling machines, four months to boring mills, three months to screw machines, six months to floor and bench work and 18 months to general work.

The consensus of opinion as expressed by the Atlantic coast shipbuilders is that uniformity is desirable and should be brought about as nearly as possible. The adoption of the general principles is hardly more than a beginning, but the interest in the matter which has already been displayed by the shipbuilders in New York, New England and other districts indicates that the movement will not end there.

Discuss Freight Handling Problems

INCREASING interest in conveying equipment was reflected in papers presented at the first annual meeting of the Material Handling Machinery Manufacturers' association at the Waldorf Astoria hotel, New York City, Feb. 26-27. Installations during the past year exceeded most predictions and buying now in prospect for the relatively near future is enormous. It was stated that in port development work alone more than \$200,000,000 will likely be expended within the next three years.

B. F. Fitch, president of the Motor Terminals Co., New York and Cleveland, spoke on "Motorizing Terminals." His description of the existing system of handling freight at Cincinnati proved of special interest. By the adoption of motor trucks and by their scientific operation many of the material handling problems at that terminal had been successfully solved, Mr. Fitch asserted. Briefly, the installation consists of overhead rails, electric cranes, electric hoists, motor trucks and a plurality of interchangeable motor truck bodies. Mr. Fitch stated that the Cincinnati installation includes 90 overhead cranes and 360 hoists.

The following board of governors was elected:

F. W. Hall, of the Sprague Electric Co., New York; H. W. Standart, Northern Engineering Works, Detroit;

J. C. Walter, Alvey Ferguson Co., New York; W. F. Merrill, Lamson Co., Boston; R. W. Scott, Otis Elevator Co., New York; D. V. Jenkins, Watson Elevator Co., New York; L. C. Brown, Elwell Parker Electric Co., New York; Roy Owens, Lakewood Engineering Co., Lakewood, O.; Fred Stadelman, Wellman-Seaver-Morgan Co., Cleveland; Thomas Robins, Robins Conveying Belt Co., New York; G. O. Helmstaedter, Hyatt Roller Bearing Co., New York, and G. W. Miller, Jeffrey Mfg. Co., Columbus, O. The board, at its March meeting, will elect officers of the association for the ensuing year.

Field is Large

While numerous important installations of conveying equipment have been made thus far, it was obvious from reports submitted at the convention that the field for this class of equipment is growing. According to A. J. Barnes, of the Shepard Electric Crane & Hoist Co., Montour Falls, N. Y., who has been for some time past in charge of a special survey for the association, a potential and actual demand for 214,464 mechanical handling machinery units now exists in the industrial field alone. These units, he explained, were such items as industrial trucks, tractors, lift trucks, industrial locomotives, portable cranes, portable conveyors and detached electric hoists. Only 5 per cent

of the plants in the country are extensively employing these units, Mr. Barnes asserted. He further stated that but 35 per cent of the manufacturers are familiar with mechanical handling equipment and its function, and that the remaining 65 per cent were entirely unfamiliar with the details of even the lesser types of such machinery. A study of 114 steamship companies covering docks and piers shows a degree of saturation of only 15 per cent and eliminating hand lift trucks, an actual saturation of only 4 per cent. From these figures it is seen that the field to be exploited is large.

In an address on "Freight Handling in England as Applied to Our Home Problem," F. T. Chambers, captain in the United States navy, asserted that the manufacturer, now that he has got his production costs on an economical basis, must see that the transportation and handling costs on his goods from the time they leave his plant to the time they reach destination are on a similar plane.

He graphically showed by apt illustrations how the cost to the ultimate consumers from foreign shipments is increased, not by cents but by dollars per ton due to the prevailing inefficient methods used throughout the United States for handling freight at transfer points. This cost, he pointed out, is easily reduced.

World Tonnage Data

The accompanying tables, prepared by *Lloyd's Register of Shipping*, show in detail the world's 1919 shipbuilding record and also each country's performance annually since 1892. The United States leads the list for 1919 with a total of 4,075,385 gross tons. Last month THE MARINE REVIEW published Lloyd's table of vessels under construction, which showed that the United Kingdom had moved slightly ahead of the United States.

In actual launchings for 1919, the United Kingdom is second on the list with 1,620,422 gross tons. Next follows Canada and other British dominions with 358,728 gross tons. The table showing the number of vessels launched year by year since 1892 is especially interesting as it shows how the world's yearly launchings increased from 1,358,045 gross tons in 1892 to 7,144,549 tons in 1919 with one extended period of decreased output. This covered the years between 1906 and 1917. During 1906, vessels numbering 1836 with a gross tonnage of 2,919,763 were launched but following the dull times in 1907 shipbuilding declined so that not until 1917, when 1112 vessels with a gross tonnage of 2,937,786 were launched, were the 1907 tonnage figures surpassed.

Of the 1919 total, the United States furnished 57 per cent and the United Kingdom 23 per cent.

Heldenfels Bros., shipbuilders, Rockport, Tex., launched the wooden cargo carrier KLATAWA on March 10.

COUNTRIES	STEAMERS AND MOTOR VESSELS.				SAILING VESSELS. AND BARGES.				TOTAL.		
	STEEL.		WOOD.		STEEL.		WOOD.		NO.	GROSS TONNAGE.	
	NO.	GROSS TONNAGE.	NO.	GROSS TONNAGE.	NO.	GROSS TONNAGE.	NO.	GROSS TONNAGE.			
BRITISH DOMINIONS:—											
CANADA { Great Lakes ...	28	60,233	...	...	...	...	...	...	263	358,728
Coast ...	24	93,070	80	86,328	...	...	69	31,638		
OTHER DOMINIONS ...	26	69,922	12	9,257	...	...	21	8,284		
BELGIUM ...	2	2,433	...	...	...	...	...	...	2	2,433
CHINA ...	6	10,750	1	1,137	2	420	...	...	9	12,307
DENMARK ...	21	31,430	11	3,355	...	...	14	2,981	46	37,766
FRANCE ...	19	28,265	9	1,331	...	...	12	3,067	34	32,603
HOLLAND ...	100	137,086	...	...	...	...	...	...	100	137,086
ITALY (including Trieste) ...	15	77,125	7	2,857	...	...	10	2,731	32	82,713
JAPAN ...	133	611,883	...	...	...	...	...	...	133	611,883
NORWAY ...	37	40,196	45	17,382	...	...	...	...	82	57,578
PORTUGAL ...	...	...	1	450	...	...	19	10,049	20	10,499
SPAIN ...	22	48,018	7	1,707	...	...	12	2,884	41	52,609
SWEDEN ...	29	43,128	17	6,626	...	...	7	1,217	53	50,971
UNITED STATES {	Atlantic Coast ...	362	1,797,862	46	82,289	8	5,563	66	88,041	1,051	4,075,385
	Gulf Ports ...	32	137,605	34	74,327	1	4,500	18	28,732		
	Pacific Coast ...	184	1,108,912	50	123,941	...	...	51	128,954	
	Great Lakes ...	199	495,559	...	...	...	...	...	...
OTHER COUNTRIES ...	...	...	1	147	...	...	4	1,339	5	1,486
TOTAL.	1,239	4,792,578	315	411,134	11	10,483	306	309,912	1,871	5,524,107	

*Including 10 vessels of 20,455 tons built of reinforced concrete

WHERE BUILT	STEAM AND MOTOR VESSELS		SAIL AND BARGES.		TOTAL.	
	No.	Tons (Gross).	No.	Tons (Gross).	No.	Tons (Gross).
UNITED KINGDOM	541	1,584,920	71	85,522	612	1,620,442
OTHER COUNTRIES	1,554	5,203,712	317	320,395	1,871	5,524,107
Total for the World	2,095	6,788,632	388	355,917	2,483	7,144,549

YEAR	UNITED KINGDOM		DOMINIONS		AUSTRIA-HUNGARY		DENMARK		FRANCE		GERMANY		HOLLAND		ITALY		JAPAN		NORWAY		SWEDEN		UNITED STATES		OTHER COUNTRIES		TOTALS		YEAR				
	No.	Tons	No.	Tons	No.	Tons	No.	Tons	No.	Tons	No.	Tons	No.	Tons	No.	Tons	No.	Tons	No.	Tons	No.	Tons	No.	Tons	No.	Tons	No.	Tons					
1892	631	1,172,950	58	19,792	No Returns	7	2,302	22	12,707	19	17,228	73	61,858	15	11,308	21	11,858	42	24,572	12	4,659	73	62,589	No Returns	28	11,103	1,051	1,358,045	1892				
1893	536	836,385	11	17,089	No Returns	6	7,435	18	10,719	22	20,337	65	60,167	8	1,339	21	10,626	3	1,132	30	16,552	18	6,566	36	27,174	No Returns	42	11,222	846	1,028,741	1893		
1894	614	1,016,208	25	6,056	1	748	5	1,703	16	7,300	28	19,636	77	119,702	41	15,360	10	5,396	14	3,173	25	17,169	14	7,310	36	44,817	7	22,047	18	6,581	932	1,222,538	1894
1895	579	950,967	23	6,105	7	4,276	10	7,371	14	10,982	27	28,851	75	87,786	25	8,292	19	5,803	3	2,296	21	12,873	13	2,767	41	42,431	20	49,096	19	8,114	880	1,218,180	1895
1896	696	1,159,751	36	8,394	5	2,730	9	6,246	14	11,814	41	44,565	63	103,295	28	12,405	10	6,779	26	7,819	17	12,059	14	4,405	112	77,964	32	106,211	10	3,415	1,119	1,567,882	1896
1897	591	952,486	36	10,489	4	1,912	6	6,801	13	13,339	39	49,341	84	159,728	42	20,351	8	12,910	27	6,740	25	17,248	14	6,994	43	31,076	21	52,762	22	6,727	990	1,331,894	1897
1898	761	1,367,670	65	22,661	5	2,857	9	8,432	17	12,703	46	67,160	101	153,147	27	19,048	19	26,530	9	11,424	29	22,670	12	4,383	141	110,186	31	63,064	23	4,863	1,280	1,683,943	1898
1899	736	1,416,791	31	6,475	3	1,989	8	9,248	30	26,618	51	89,794	93	211,684	50	34,384	31	49,472	3	6,775	34	27,663	29	10,367	127	146,106	31	78,170	32	6,015	1,380	2,121,788	1899
1900	692	1,442,471	38	6,967	2	2,596	12	14,839	17	11,060	66	116,856	93	204,731	61	46,074	36	67,522	3	4,613	42	32,751	19	6,735	196	190,962	39	142,565	46	18,439	1,394	2,304,163	1900
1901	639	1,524,739	68	16,610	6	11,524	7	20,013	41	22,856	92	177,543	101	217,693	33	29,987	65	60,826	94	37,208	40	36,876	31	8,241	234	268,091	52	165,144	46	20,649	1,538	2,617,589	1901
1902	694	1,427,658	65	18,238	4	10,584	16	15,192	44	27,118	99	192,196	108	213,961	114	89,101	62	66,270	63	27,181	46	37,878	32	9,030	206	233,360	45	158,814	62	29,247	1,650	2,502,766	1902
1903	697	1,190,618	64	20,466	9	13,824	6	11,328	39	28,609	75	92,768	120	164,494	109	59,174	81	50,089	62	31,514	54	41,599	30	11,655	196	211,219	51	170,601	68	24,073	1,603	2,146,981	1903
1904	712	1,205,162	65	27,353	6	3,713	40	16,646	30	16,859	69	81,245	149	202,197	109	56,656	35	30,016	67	32,969	67	60,169	32	10,267	208	189,430	19	49,088	46	17,987	1,643	1,967,985	1904
1905	735	1,623,168	45	—	10,798	27	16,402	19	17,567	43	73,124	148	255,423	68	44,136	46	61,629	81	31,723	58	52,840	30	5,282	157	107,368	43	195,459	36	20,272	1,576	2,511,922	1905	
1906	886	1,828,543	50	16,026	7	10,016	25	18,690	16	24,712	48	35,214	206	318,230	89	66,809	30	30,560	107	42,469	69	60,774	23	11,679	192	169,358	50	271,729	37	15,334	1,836	2,919,763	1906
1907	841	1,607,890	81	21,479	14	24,964	7	8,717	29	28,819	50	61,635	188	276,008	60	68,623	31	44,666	78	66,254	82	57,566	28	11,781	208	217,830	47	257,145	42	26,026	1,783	2,778,063	1907
1908	523	929,669	111	26,512	8	8,669	24	23,502	24	19,172	50	83,429	120	307,777	76	68,604	34	26,664	73	59,735	81	52,839	23	9,546	202	158,645	36	145,496	20	23,435	1,605	1,833,386	1908
1909	526	971,066	35	6,992	8	869	15	25,006	11	7,608	61	43,197	84	128,696	52	69,106	28	31,217	76	52,319	48	38,601	12	6,816	73	80,483	29	129,119	24	12,960	1,063	1,802,667	1909
1910	506	1,143,169	53	14,601	7	11,742	8	14,804	16	12,154	63	60,781	117	159,303	108	70,945	21	35,019	70	80,216	64	34,981	17	8,904	156	177,601	39	153,717	47	30,497	1,277	1,867,863	1910
1911	772	1,809,844	59	16,006	3	3,666	16	37,856	18	16,699	79	125,472	164	265,632	118	96,006	14	17,401	109	44,389	71	35,435	11	9,422	112	96,893	50	78,878	38	17,964	1,509	2,050,140	1911
1912	712	1,738,514	76	26,090	8	9,700	12	38,821	22	26,103	80	110,754	166	375,317	136	99,489	37	35,166	168	67,765	89	50,265	22	13,968	144	194,273	80	89,950	52	46,684	1,719	2,301,700	1912
1913	688	1,932,153	77	26,744	14	21,696	17	61,737	31	40,932	89	176,095	162	465,326	95	104,396	38	30,356	152	64,664	74	50,637	25	18,524	182	238,232	43	68,216	63	48,456	1,760	2,332,882	1913
1914	656	1,658,553	58	22,288	32	25,246	11	34,835	23	32,815	33	114,062	89	367,192	130	116,153	47	42,961	32	85,661	61	54,204	24	15,163	84	162,937	10	37,825	36	36,148	1,319	2,353,753	1914
1915	527	604,919	27	13,289	4	8,725	No Returns	23	45,198	6	23,402	No Returns	120	110,075	30	22,132	26	49,408	59	62,070	27	30,319	76	167,167	8	20,293	101	13,641	743	1,301,636	1915		
1916	306	608,235	36	22,577	4	8,994	No Returns	28	35,277	9	42,762	No Returns	201	180,197	10	56,654	53	145,624	52	42,458	34	36,769	167	384,899	44	119,248	18	14,296	964	1,688,080	1916		
1917	286	1,162,896	80	66,475	26	27,596	No Returns	22	2,445	6	16,828	No Returns	146	148,779	11	38,906	104	350,111	41	46,105	34	36,760	266	121,115	60	176,804	37	32,588	1,112	2,837,796	1917		
1918	301	1,138,120	184	230,514	22	49,390	No Returns	13	26,103	3	13,715	No Returns	74	74,026	15	60,791	198	498,924	51	47,723	36	59,583	74	2,612,153	168	300,877	40	34,478	1,886	5,977,944	1918		
1919	612	1,620,412	235	298,495	28	60,235	—	—	36	37,766	34	32,663	—	137,086	32	82,713	133	611,888	82	57,578	53	50,971	432	4,797,826	199	495,359	77	79,334	2,423	7,144,540	1919		

Builds Craft for Coast Service

Steel Vessel With Machinery Amidships Has a Speed of 10 Knots—Boilers Are Designed to Burn Oil Fuel

THE E. D. KINGSLEY, a recent product of the Canadian Car & Foundry Co., was built from designs furnished by Cox & Stevens, naval architects, New York. The vessel registers 1260 tons deadweight, and is representative of one type of craft becoming popular in the coastwise, islands and South American trade. The ship is shown in the accompanying illustration.

The KINGSLEY is a steel vessel. Her hold is divided into five compartments consisting of forepeak, fore cargo hold, engine and boiler space, after hold and afterpeak. All bulkheads are watertight to insure the vessel keeping afloat in case one of her compartments is damaged. In addition to her two cargo holds, the vessel has cargo space in the 'tween decks. The forward hold has a capacity of 39,000, the after hold 13,330 and the 'tween decks 16,630 cubic feet, making a total of 68,960.

The vessel's general hull dimensions are as follows:

Length, overall, feet.....	210
Length between perpendiculars, feet.	200
Beam, feet.....	32
Depth at side, feet.....	17
Draft, maximum, feet.....	15
Displacement, gross tons.....	2096

As a lumber carrier, the vessel can handle 77,800 board feet of Oregon pine when a 7-foot deck load is included. Fuel capacity in her double bottoms is 158 tons. Her fresh water capacity of 42 tons is amply sufficient.

The KINGSLEY's machinery is modern in all respects. Her engine is of the upright, inverted, triple-expansion, condensing type with cylinders 17 x 25 x 43 inches bore with 30-inch stroke, developing 860 indicated horsepower. Steam is supplied by two Scotch type, 3-furnace, marine boilers with an allowed working pressure of 190 pounds to the square inch. The boilers are 11 feet 11 inches long by 11 feet 3 inches diameter. The condenser is of the surface type with 1200 square feet of cooling surface. A Riley feed water heater and an evaporator are installed.

The main air pump is a Worthington vertical simplex, $7\frac{1}{2}$ x $14\frac{1}{2}$ x 8 inches, while the circulating pump is an 8-inch centrifugal unit furnished by the Morris Machine Works. The main and auxiliary feed pumps are 8 x 5 x 12 inches, Davidson vertical simplex. The fire, bilge and general service pump is a $7\frac{1}{2}$ x 7 x 10-inch Worthington horizontal simplex. Other pumping equipment includes the oil transfer, horizontal simplex, $7\frac{1}{2}$ x 7 x 10 inches; sanitary, $5\frac{1}{4}$ x $4\frac{3}{4}$ x 5 inches; fresh water, horizontal duplex, 3 x 2 x 3 inches; evaporator feed, horizontal duplex, 3 x 2 x 3 inches. The oil burning system was supplied by Coen Co., San Francisco, while the generating set is an Engberg, $7\frac{1}{2}$ kilowatt, direct-connected outfit.

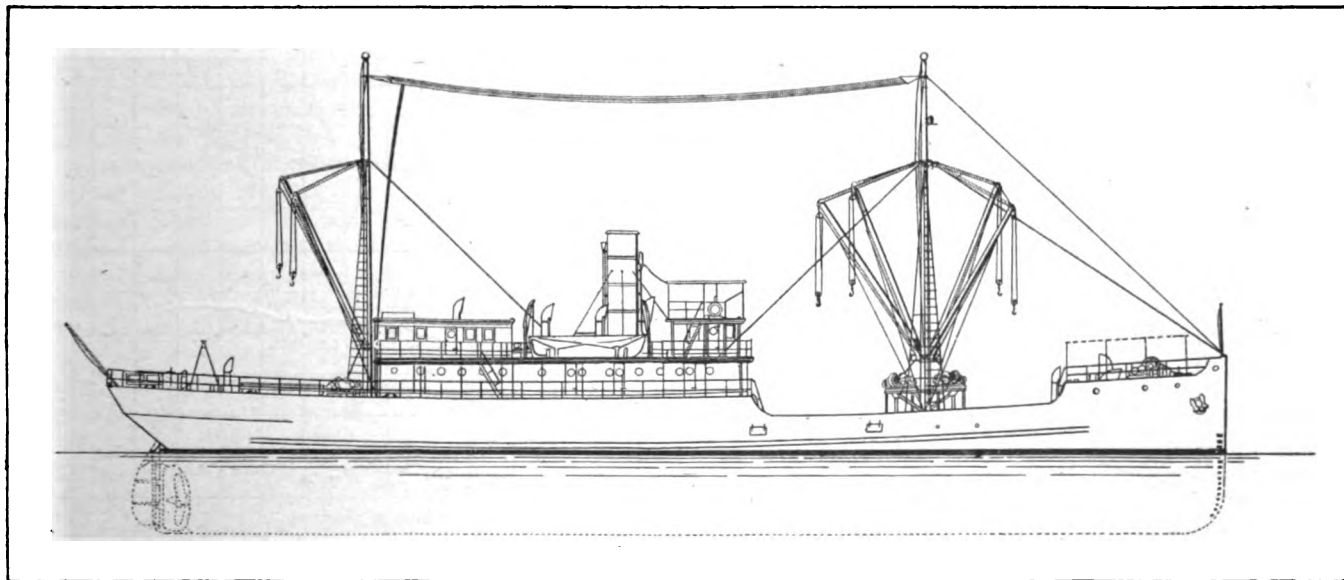
Cargo handling equipment was furnished by the Sorel Mechanical Shops, Ltd., Quebec, and consists of six dou-

ble 7 x 9-inch cylinder winches. Four are located at the foremast on a superstructure provided for the purpose and two on the after deck at the foot of the mainmast. This arrangement gives two winches at each cargo hatch. The foremast is equipped with four 3-ton booms and the mainmast with one 8-ton boom. This boom is adjustable from either side of No. 2 hatch. The main mast also carries two 3-ton booms.

The main deckhouse contains staterooms for the chief engineer, second officer and third officers, while the officers' saloon and messroom is located at the extreme forward end. The galley, storerooms, crews' mess, pantry and stateroom for the cook and steward are located in the middle of the main deckhouse. The after end of this house accommodates the engineers' staterooms, officers' bath and the wireless room.

The pilot house is divided into the wheelhouse and chartroom, the latter being provided with a spare berth. The after house on the main deckhouse contains the captain's and chief officer's staterooms, saloon, bathroom and two spare staterooms. The crews' quarters are on the main deck under the fore-castle head. There are five rooms provided for two men each and one room for four men, together with bath and mess room.

The KINGSLEY is said to be an economical vessel in operation and when loaded she develops a speed of 10 knots an hour.



E. D. KINGSLEY, 1260-DEADWEIGHT TON STEEL VESSEL RECENTLY PLACED IN COMMISSION IN THE PACIFIC-SOUTH AMERICAN TRADE—SHE HAS A SPEED OF 10 KNOTS, LOADED

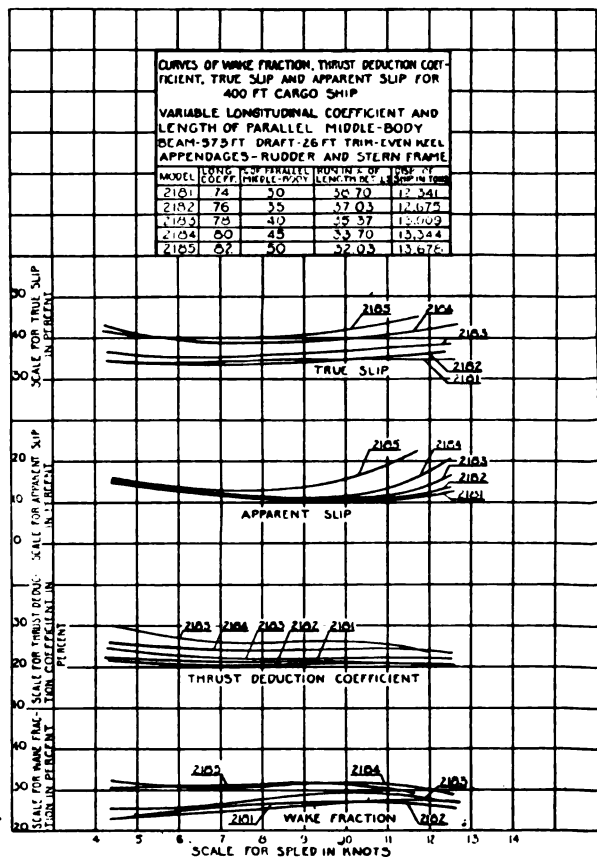
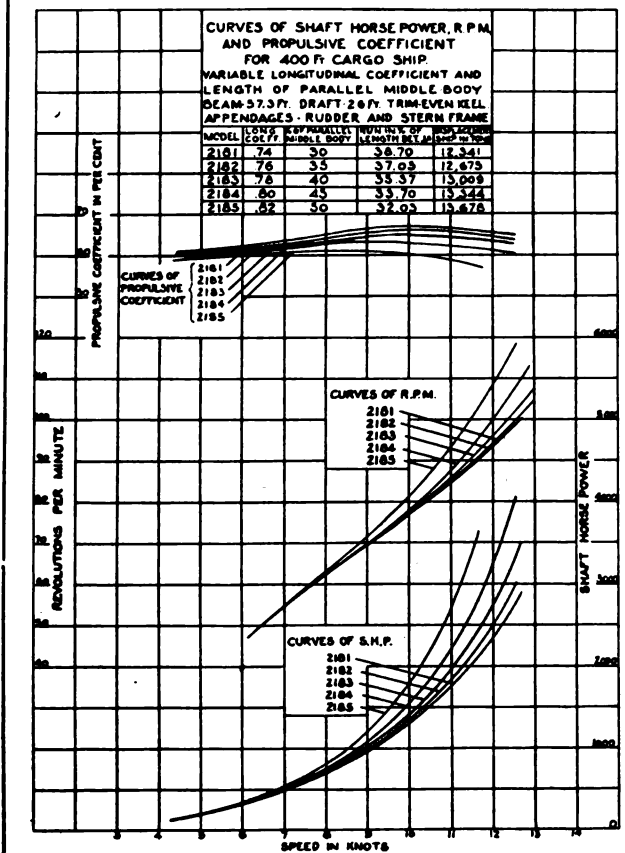
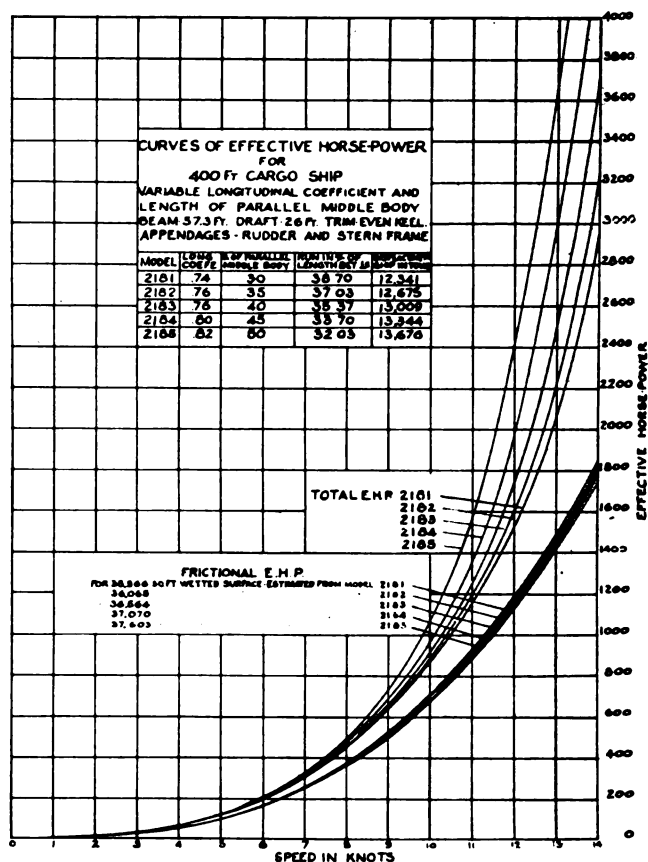
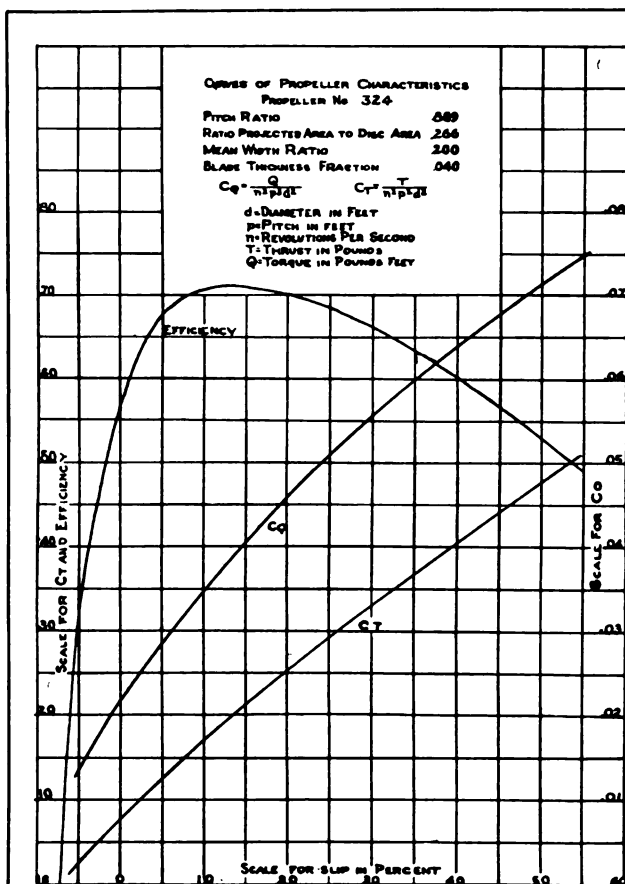


FIG. 1—CURVES OF PROPELLER CHARACTERISTICS FIG. 2—CURVES OF EFFECTIVE HORSEPOWER FIG. 3—CURVES OF SHAFT HORSEPOWER AND PROPULSIVE COEFFICIENT FIG. 4—CURVES OF WAKE FRICTION, THRUST DEDUCTION COEFFICIENT, TRUE AND APPARENT SLIP—THESE CURVES ALL PERTAIN TO A 400-FOOT CARGO VESSEL

Single Screw Ship Efficiency

Propulsive Results Which Should be Secured in This Type of Vessel Are Established by Experiments With Models

BY COMMANDER WILLIAM McENTEE, U. S. N.

EXPERIMENTS made at the United States experimental model basin with models of single-screw cargo ships have shown among other things that for good propulsion efficiency is necessary to have the run finer than the entrance, and for vessels of this class having a parallel middle body equal to about one-third the length of the ship the minimum power is required when the fore-and-aft position of the parallel middle body is such that about two-thirds of it is forward of the midship section and one-third abaft it. Those results, which it is believed were the first of any extensive series of experiments with self-propelled models of single-screw ships to be made public, were confirmed by a somewhat similar series of tests made at Clydebank on models of vessels of the same general class. The results of the latter tests were presented in a paper by James Semple before the Institution of Naval Architects in April, 1919.

In view of the importance of this class of vessel it was considered desirable to extend the investigation, and the present paper contains the results of the tests of five additional models, the characteristics of which are given in the accompanying table.

The lines of the parent form, model 2023, are shown in Fig. 5. In Fig. 6 are shown the sectional area curves for the five models and the parent form.

The investigation had for its object determination of the effect of varying the amount of parallel middle body and the longitudinal coefficient simultaneously while maintaining the principal overall dimensions. In other words, the investigation sought to obtain data from which it would be possible at any given practicable speed for a cargo carrier to determine the economic possibilities of increasing the displacement by increasing the parallel middle body and longitudinal coefficient. A great many vessels of this character now built have coefficients ranging from 0.78 to 0.80,

and the question to be determined was the economic limit of fullness so far as coefficient and displacement are concerned for a vessel of a given length, beam, and draft. In the five models tested, the longitudinal coefficient varied by increments of 0.02 from 0.74 to 0.82.

Previous experiments at the experimental model basin have shown that, for a single-screw cargo ship of about 0.78 coefficient, it is desirable to use a parallel middle body of about one-third

and, together with the propeller shaft, propeller, and dynamometer, was transferred from one model to the other as the experiments with each model were completed.

The dynamometer consisted of a small direct-current motor, the armature shaft of which was directly connected with the propeller shaft by means of a flexible coupling. The armature shaft was free to float fore and aft in its bearings about $\frac{1}{8}$ inch in an axial direc-

tion. The armature shaft was connected to a calibrated spring by means of a thrust bearing, so that the axial displacement of the armature shaft gave a measurement of the pro-

PELLER thrusts. Similarly, the frame of the motor was mounted so as to rotate in independent bearings. The torque developed by the motor acted against a calibrated spring so that the deflection of the spring indicated the torque of the motor. In addition to this, suitable means were provided for measuring the revolutions of the shaft.

The order of procedure in making the tests was as follows: The shaft and dynamometer were carefully lined up and the whole run for a sufficient time to warm up the bearings and reduce the bearing friction as much as possible. Owing to the fact that the dynamometer was placed close to the stern, but a short length of propeller shafting was necessary, and this was supported by two self-aligning bearings, one at the stern bearing and the other at the forward end of the stern tube. With the propeller shaft in place and everything working freely, the model was towed in the model basin beneath the towing carriage at several different speeds, and the propeller shaft, without propeller, run at the range of revolutions to be covered in the course of the experiments. The propeller was then fitted to the shaft, and cards for torque and thrust and revolutions per minute were taken with the model self-propelled at different speeds. In these tests the model was guided by two plates about 10 inches in width placed at either end of the model so as to

Characteristics of Five Test Models

Model number	Longitudinal coefficient	Per cent of parallel middle body	Run in per cent of length	Displacement, tons
2181	0.74	30	38.70	12,341
2182	0.76	35	37.03	12,675
2183	0.78	40	35.37	13,009
2184	0.80	45	33.70	13,344
2185	0.82	50	32.03	13,678

the length. For simplicity in construction, however, it is desirable to use a somewhat greater length of parallel middle body. It is possible to use with this coefficient a parallel middle body of about 40 per cent of the ship's length without much sacrifice in power. This consideration determined the extent of parallel middle body for each model as given in the accompanying table. Comparison of results of the present series with previous results shows that an increase of parallel middle body from 33 per cent to 42 per cent causes an increase in effective horsepower of but 3 per cent only.

In order to keep the run fine, the fore-and-aft distribution of the parallel middle body was retained the same as had previously shown the best results, that is, one-third abaft the midship section and two-thirds forward of it. This distribution possibly gives for the higher coefficient a model which is too bluff at the entrance, especially at the higher speeds. For the lower speeds, the distribution of sectional area seems to be satisfactory, particularly as regards eddying at the stern, which is liable to occur with vessels of full coefficient.

The models were carefully made and all were fitted with the same cast stern frame, which included the stern bearing for the propeller shaft. The stern frame had the rudder cast with it. The whole frame and rudder was fitted to each of the four models before the self-propulsion experiments were undertaken,

A paper presented at the twenty-seventh general meeting of the Society of Naval Architects and Marine Engineers, held in New York. The author is a commander in the construction corps, United States navy.

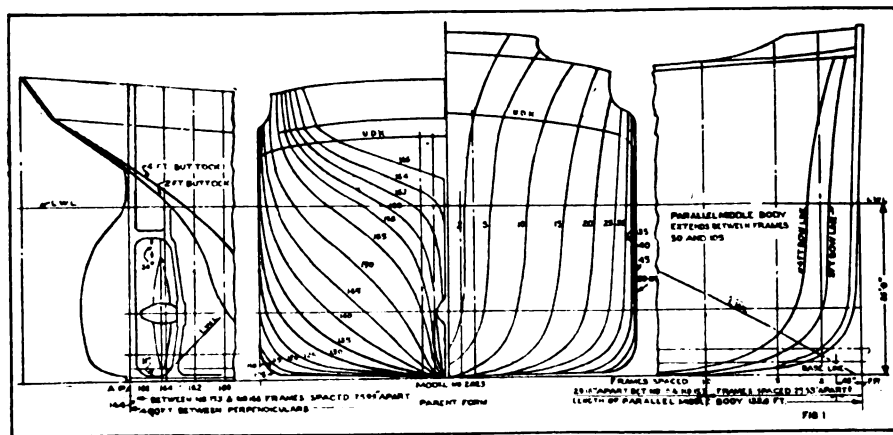


FIG. 5—DETAILS OF MODEL USED IN DETERMINING PROPULSIVE EFFICIENCY OF 400-FOOT CARGO VESSEL

steer it in a straight course. The guide plates floated between the guiding points attached to the carriage, but the towing carriage did not exercise any force on the model in a fore-and-aft direction. Starting at low speeds corresponding to about 5 knots for the ship, the towing carriage was adjusted to run at a uniform speed.

The rheostat controlling the speed of the propeller dynamometer was then adjusted so that the thrust of the propeller would just keep the model running as fast as the towing carriage, without striking the stops, which were placed at an interval of 6 inches. Thus starting with the model in the mid position, it was free to gain or lose a distance of 3 inches as compared with the towing carriage before striking either stop. When the propeller was running at the proper speed to keep the model up with the towing carriage, the record of thrust, torque and revolutions per minute was taken. If, in the course of the run, the model struck either stop on the carriage, the run was discarded and another run made. Having obtained the desired data at the lowest speed, the carriage speed was increased for subsequent runs and similar data taken at higher speeds. The range covered corresponded to speeds of 5 to 13 knots for the ship. About 40 different runs were made with each model, giving a corresponding number of points for plotting the torque, thrust and revolutions per minute curves.

Reduces Magnetic Thrust

The armature of the propeller dynamometer was especially designed to reduce to a minimum the amount of magnetic thrust. This thrust increased with the torque and amounted to 0.17 pound when the armature was displaced $\frac{7}{8}$ inch and the torque delivered to the shaft was 16 pound-inches. Neglecting this at higher powers would have caused an error in thrust measurements of about 1.4 per cent, but would not

have caused any error in the power measurements. However, this magnetic thrust was separately calibrated, and corrections for it were made in working up the results of the experiments.

Immediately after completion of the self-propulsion tests on the model, the propeller was removed, and the runs to obtain the shaft friction and the thrust without propeller were repeated. The model was next connected with the resistance dynamometer on the towing carriage and the usual model resistance data taken. This insured that the conditions of test, both for self propulsion and for the resistance of the model, would be uniform as regards conditions of the model, temperature of water, etc.

The following are the dimensions of the propeller used in the experiments and also the dimensions expanded to the ship scale:

	Model	Ship
Diameter	10.125 inches	16 feet 7 inches
Pitch	9.0 inches	14 feet 9 inches
Pitch ratio		0.889
Mean width ratio		0.20
Number of blades		3
Ratio of projected to disk area		0.266
Blade thickness fraction		0.04

The propeller had three blades of Taylor's standard form. The propeller characteristics were obtained by separate tests of the propeller model run in free water, that is, in a separate apparatus where the propeller shaft projected well ahead, so that the propeller ran in water undisturbed by the action of the testing apparatus. The same motor dynamometer was used for tests as was used for the self-propulsion tests, the only difference being that the propeller shaft was coupled to the forward end of the armature shaft instead of the after end.

The characteristics of the propeller are given in Fig. 1. The thrust constant, C_T , and the torque constant, C_Q , are plotted on nominal slip following the method used by Schaffran. These constants, which are in nondimensional form, lend themselves well to the an-

alysis of self-propulsion experiments and to the extension of the results to the full-size ship.

The results of the investigation are given in Figs. 2, 3 and 4. An examination of the estimated horsepower curves and the shaft horsepower curves for the various models shows, as was to be expected, wide variation in power requirement, especially at higher speeds. For example, at 11 knots passing from model 2181, longitudinal coefficient 0.74, to model 2185, longitudinal coefficient 0.82, with a change in displacement of 1337 tons, or 10.8 per cent, increases the effective horsepower from 1165 to 1585 or 36 per cent, while the shaft horsepower is increased by 950 or 54 per cent. In this range the percentage increase in effective horsepower required is about three and one-half times as much as the increase in displacement, while the increase in shaft horsepower is five times as great as that in displacement. At a speed of 11 knots the increased displacement is obtained by an apparently unwarranted increase in power. This results from the fact that the natural increase in effective horsepower resulting from the larger displacement and coefficient is magnified or augmented by an accompanying fall in the propulsive coefficient from 0.665 to 0.587.

Change is Slight

In the tests the same propeller was used on all models, and it may be considered that the propeller is too small for the ship represented by model 2185, as the revolutions per minute have increased from 84.5 to 93.2. This is to some extent true, but separate estimates indicate that if a propeller of different diameter or pitch were fitted to 2185 for the purpose of reducing the revolutions to 84.5, such change would make but little change in the propulsive coefficient, not over 1 per cent, so for all practical purposes the models may be compared on the basis of the shaft horsepower curves shown in Fig. 3 without taking the revolutions into consideration.

As another comparison of these results, it is interesting to consider the effect of increasing the longitudinal coefficient and displacement of the ship represented by model 2183. The curves show that at a speed of 11 knots an increase of longitudinal coefficient from 0.78 to 0.80 with a corresponding increase in displacement of 335 tons or 2.57 per cent requires an 8 per cent increase in effective horsepower and 12.27 per cent increase in shaft horsepower. Of the increased displacement, only a part would be available as cargo carrying capacity, depending upon the necessary increase in the weight of the

hull, machinery, and fuel. On a given trade route, with a knowledge as to the cost of fuel and other expenses proportional to the power, it may readily be determined whether the additional cargo carried for the additional displacement would be economically possible with the increased power charges.

In Fig. 4 are shown the curves of wake friction, thrust deduction coefficient, apparent slip and true slip for the ships. In extending the results of the model experiments to the full-sized ships it has been assumed that the wake fraction and thrust deduction coefficient for the ships are the same as for the models.

As the American practice in defining the wake as a percentage of the ship's speed varies from that followed in Great Britain, the following definitions of the thrust deduction coefficient and the wake fraction are given:

$$t = \frac{T-R}{T}; w = \frac{V-V'}{V}$$

In this equation T is the thrust of the propeller, R the resistance of the ship, V the speed of the ship, V' the speed of advance of the propeller in the water

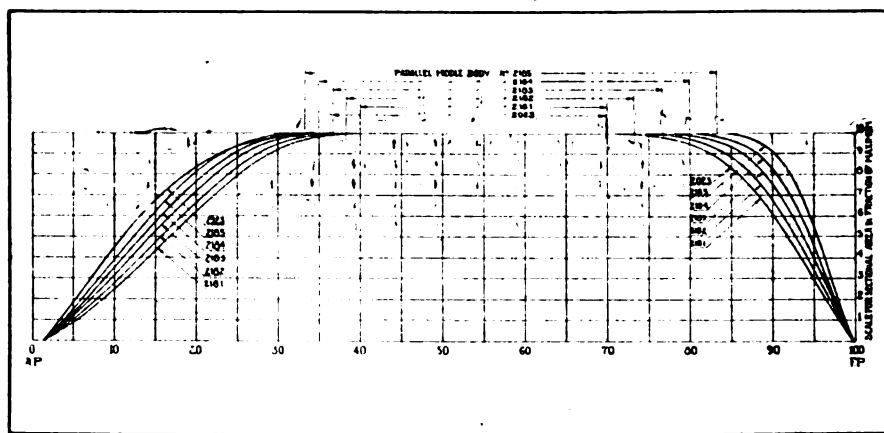


FIG. 6—SCALE FOR PERCENTAGE OF LENGTH BETWEEN PERPENDICULARS FOR MODEL OF 400-FOOT CARGO VESSEL

in which it works in ordinary practice.

With regard to the shaft horsepower required for the ships represented by the different models, it should be noted that the curves show what may be expected under trial conditions, that is, with a clean, freshly painted bottom and a smooth bronze propeller running in smooth water. To maintain the same sea speed over considerable periods, it is necessary to allow a margin of power to cover the increased resistance due to

average sea and weather conditions and a moderate amount of fouling of bottom which occurs between each docking and painting.

Summing up the results of both series of experiments, it appears safe to conclude that, for a well designed hull with a propeller running at about 90 revolutions per minute, a hull efficiency of 1.09 and a propulsive efficiency of 0.65 may be expected in a single-screw cargo ship.

What the Europeans Are Doing

BY FRANCIS MILTOUN

Paris Representative of The Marine Review

THE shortage in French marine transport is being as keenly felt and is proving as detrimental to national prosperity as is the transport crisis on land. During the period of the war, not a single passenger craft was launched in France. One company alone, the famous Messageries-Maritimes, lost 11 of its passenger vessels and but one had been acquired during the period to take their places. The effort of this great company to meet the present situation has resulted in the acquisition of a number of steamers bought in Japan. The fleet now finds itself augmented by a hundred thousand tons which more than makes up for its losses during the war. The relations of France with her colonies and her spheres of influence in the East makes necessary the development of these eastern lines of the Messageries and the effort is such that it has received approval on all sides.

* * *

Port Takes on New Life

The artificial port of Zeebrugge is practically in condition to receive a traffic comparable to that which it served before the war. It will become the home port of far more ships than for-

merly trading under the Belgian flag, besides offering accommodation as a port d'escale for ships up and down channel. The ravages occasioned by the German occupation are for the major part already repaired. Work is rapidly being carried on for putting into condition the port of Bruges, the sister inland port of Zeebrugge, which accommodates deep water ships of a considerable draft. The Zeebrugge roads will be further fitted to establish a great fishing port which industry will prove of a great economic value to Belgium and the hinterland.

* * *

Builds Merchant Ships

What Americans would call nationalization, and what the French call *etatisme*, has resulted in a number of merchant steamers being laid down in French government shipyards. The results have not been wholly satisfactory. In theory, it is supposed to be the first step toward a national socialism, like the government ownership of steamer lines during normal times.

The outgoing French parliament, as one of its last acts, voted \$200,000,000 (normal exchange) for the construction of merchant ships in government navy

yards. Protests were raised on all sides, as well from the private shipbuilders as from the taxpayer who objected that his money should be used to bolster what he considered was private enterprise since these completed ships were in the final order of things to be run by private owners and not by the government. The French Naval league and the Association of French Port Commissions petitioned the government not to ratify the expenditure. The reason invoked by the government for building these ships in naval yards was that private builders were not able in the present state of raw material deliveries, uncertain transport and the possibility of labor unrest, whereas the government could, in no small measure, more than meet these issues should the situation become more critical and the ships would thus be ready for service at a much earlier date. The need is great hence the measure may be considered as one of expediency.

As against this government plan, M. Chaumont, president of the French Naval league, stated that French shipowners had actually acquired 700,000 tons of shipping since the armistice and had on order in French or foreign yards an additional 1,250,000 tons. Further-

more, French yards were in a position to make even further deliveries could they but be guaranteed additional supplies of ship plates.

This résumé should indicate the French effort which is being made for upbuilding the country's fleets, and some of the difficulties under which the work is being accomplished. It is certain that if warships are no longer to be built (which is an open question in the present state of world affairs in spite of the tentative treaty terms) government yards might indeed as well be used for building ships of peace as lie idle. They might, of course, be rented to private builders, but it is a fact that French government yards are often far behind those of private companies in equipment. The whole advantage of government participation in shipbuilding in France is their better opportunity of procuring raw materials and the handling of labor, two aspects of the production problem which should not be beyond the capacity of the private yard. There the matter rests. A beginning has been made.

* * *

Plan Deep Sea Ferry

The creation of a service of deep sea ferry boats between Zeebrugge and England has already been decided. The service will first be developed for freight exclusively but if it proves as successful as is hoped a passenger service will also be established which will permit passengers from England to arrive more quickly and comfortably in the cities of the interior of Belgium and those bordering the lower Rhine—Dusseldorf, Cologne and Coblenz—than by any means at present existing. The ferry boats are actually under construction. Two shipyards will also be established at this further outpost of Belgium which in spite of its limited sea front is bound to play a far more important part in the future development of central Europe than the country has ever done in the past. Antwerp and its satellite ports of Bruges, Zeebrugge and Ghent will thus become more than a rival of the Dutch port of Rotterdam with which, previous to the war, it ran neck and neck in importance.

* * *

Antwerp Has Revived

The movement of the port of Antwerp, by comparison of all other ports of continental Europe, has shown a remarkable renaissance since the armistice. During January, 1920, there were 570 entries of ships of all classes, totaling 721,226 tons, 479 steamers and 91 sailing ships. The various basins, or enclosed docks, entered by dock gates, handled the bulk of these entries, a third tying up to the river wharves of

the Scheldt. Of departures during the month 363 ships went to sea bearing cargo and 197 in ballast.

These statistics constitute a new proof of the notable and constant progress of this, perhaps, greatest of all European ports. It shows an increase of more than 15 per cent over the figures of December last. During many days the activity of the port was such that it was practically a repetition of the most palmy days of before the war. Of the entries during January more than 50 had a draft exceeding 25 feet, which argues for the adaptability of this great port to cargo carrying vessels of the highest class.

* * *

Shipbuilders Merge

Preparations for the boom in shipbuilding generally expected in Great Britain include a number of amalgamations of several shipbuilding companies. The banking firm of Sperling & Co., acting on behalf of an important shipbuilding syndicate, in which the Northumberland Shipbuilding Co., Ltd., is interested, has purchased the National shipyard at Chepstow.

Messrs Sperling & Co., acting on behalf of the same financial group,

have acquired a controlling interest in Swan, Hunter & Wigham Richardson, Ltd., of Walker and Wallsend-on-Tyne and Southwick-on-Wear. The same syndicate has also recently obtained the control of Workman Clark & Co., Ltd., Belfast. No immediate changes in the management or policies of the yards may be expected, as the amalgamation has been brought about solely with a view to the community of interests and economies in the costs of production. This group already controls the Northumberland Shipbuilding Co., Ltd., Doxford & Sons, Ltd., Sunderland, and the Fairfield Shipbuilding & Engineering Co., Ltd., Govan, and with their latest acquisition will have by far the largest shipbuilding and marine engineering output in Great Britain.

* * *

Replace Lightships

The Belgian maritime authorities have re-established their pilot system and lightships which had been suppressed during the war. The first of the light ships established off the estuary of this now internationalized waterway was the WANDELAAR, followed this last month by the WIELINGEN light vessel.

Port Distances from the Panama Canal

THE following tabulation, recently issued by the Panama canal, gives distances to the nearest canal terminal from various important ports throughout the world. The figures represent nautical miles and in computing distances where it is necessary to include the length of the canal, 43 nautical miles should be added.

Montreal, Can.....	3,160	Buenos Aires, Argentina..	5,450	San Diego, Cal.....	2,843
Halifax, N. S.....	2,317	Ascension Island.....	4,212	Magdalena Bay, Mexico..	2,265
Portland, Me.....	2,198	St. Helena Island.....	4,878	Mazatlan, Mexico.....	2,006
Boston, Mass.....	2,157	Cape Town, Africa.....	6,574	Acapulco, Mexico.....	1,426
New York, N. Y.....	1,974	Monrovia, Liberia.....	4,148	Salina Cruz, Mexico.....	1,170
Philadelphia, Pa.....	1,946	Freetown, Sierra Leone... 3,983		San Jose, Guatemala.....	886
Baltimore, Md.....	1,901	St. Vincent, C. V. I.... 3,268		La Union, Salvador.....	748
Norfolk, Va.....	1,779	Funchal, Madeira.....	3,859	Amapala, Honduras.....	745
Wilmington, N. C.....	1,730	Fayal, Azores.....	3,288	Corinto, Nicaragua.....	683
Charleston, S. C.....	1,564	Gibraltar (Strait).....	4,343	Puntarenas, Costa Rica... 471	
Savannah, Ga.....	1,607	Marseilles, France.....	5,036	Pedregal, Panama.....	243
Jacksonville, Fla.....	1,535	Genoa, Italy.....	5,203	Buenaventura, Colombia... 356	
Key West, Fla.....	1,065	Naples, Italy.....	5,325	Guayaquil, Ecuador.....	793
Mobile, Ala.....	1,393	Constantinople, Turkey... 6,166		Callao, Peru.....	1,346
New Orleans, La.....	1,403	Odessa, Russia.....	6,509	Iquique, Chile.....	1,778
Galveston, Tex.....	1,493	Port Said, Egypt.....	6,268	Antofagasta, Chile.....	2,140
Tampico, Mexico.....	1,485	Lisbon, Portugal.....	4,205	Valparaiso, Chile.....	2,616
Tuxpan, Mexico.....	1,455	Bordeaux, France.....	4,598	Coronel, Chile.....	2,822
Veracruz, Mexico.....	1,420	Havre, France.....	4,610	Punta Arenas, Chile.....	3,943
Belize, Brit. Honduras... 816		Bishops Rock, Scilly Is.. 4,356		Cape Horn, Chile.....	4,260
Puerto Barrios, Guatemala 780		Liverpool, England.....	4,548	Galapagos Islands.....	864
Truxillo, Honduras.....	622	Glasgow, Scotland.....	4,492	Marquesas Islands.....	3,826
Bluefields, Nicaragua.....	276	Plymouth, England.....	4,455	Christmas Island.....	4,752
Port Limon, Costa Rica... 192		London, England.....	4,763	Honolulu, Hawaii.....	4,685
Bocas del Toro, Panama... 144		Antwerp, Belgium.....	4,808	Midway Islands.....	5,707
Habana, Cuba.....	1,003	Amsterdam, Holland.... 4,832		Yokohama, Japan.....	7,682
Bermuda Islands.....	1,643	Hamburg, Germany.....	5,070	Vladivostok, Siberia.....	7,833
Kingston, Jamaica.....	551	Copenhagen, Denmark... 5,350		Shanghai, China.....	8,556
Port au Prince, Haiti.....	774	Christiania, Norway.....	5,237	Hongkong, China.....	9,195
San Juan, Porto Rico.....	993	Stockholm, Sweden.....	5,897	Manila, P. I.....	9,347
St. Thomas, Virgin Id.... 1,029		Petrograd, Russia.....	6,282	Singapore, S. S.....	10,505
Barbados, West Indies... 1,237		Bergen, Norway.....	5,295	Batavia, Java.....	10,610
Port of Spain, Trinidad... 1,159		Archangel, Russia.....	6,900	Port Apra, Guam.....	7,988
Curacao.....	699	Sitka, Alaska.....	4,547	Caroline Islands (Ponape) 7,321	
Cartagena, Colombia.....	281	Vancouver, B. C.....	4,032	Marshall Islands.....	7,041
La Guaira, Venezuela.....	841	Seattle, Wash.....	4,021	Jiji Islands (Levuka).... 6,288	
Georgetown, Br. Guiana... 1,535		Port Townsend, Wash.... 3,985		Samoa (Apia).....	5,710
Paramaribo, Ditch. Guiana 1,648		Astoria, Oreg.....	3,775	Tahiti, Society Islands... 4,486	
Para, Brazil.....	2,374	Portland, Oreg.....	3,869	Sydney, Australia.....	7,674
Pernambuco, Brazil.....	3,458	San Francisco, Cal.....	3,245	Melbourne, Australia.....	8,255
Rio de Janeiro, Brazil... 4,349		Los Angeles, Cal.....	2,913	Wellington, New Zealand... 6,503	

Truth About Japanese Shipping

Rising Operating Costs and Poor Ships Are Factors Seriously Hindering Japan's Present-Day Aspirations for Marine Supremacy

BY STANLEY MORGAN

EXPANSION of Japanese shipping which the world has heard so much about is, when all is said and done, a little over advertised. There is much less to fear from it than the alarmists would have us believe because the expansion that has taken place has been in that section of her shipping—by far the greater section too—which trades around her own coast, the China coast, and the coasts of nearby countries.

Yet another thing to consider is the enormous tonnage of old "rattletraps" which are owned in Japan, and which will soon have to be replaced. From all waters, it seems, Japanese owners have drawn bottoms to their fleets which are in their last stage of decay, ships that any self-respecting sailor would refuse to board, hulks that even the most speculative of the western insurance companies would not consider insurable. The Japanese founded their merchant marine on such purchases and what success they have had with them has been due entirely to the high freights ruling during the war. Under normal conditions, the firms holding such property would have passed out of existence. Now the cost and time it will take to replace this tonnage will have a retarding effect upon the expansion which these firms had hoped for. This will be especially noticed among the smaller concerns, the aggregate tonnage of which comprises by far the greater part of the Japanese mer-

chant marine. And, furthermore, owing to the underestimation of the duration of the war, many of these companies overbought. Consequently they will now find ships on their hands which, owing to the changed conditions, they will find some difficulty in filling. To say the most, they will not be able to make this high cost tonnage pay with freight rates coming down as they are at present. And for most of these ships they had to pay over 200 yen per ton.

Gets Information Firsthand

During a short stay in Kobe in 1919, I noticed several ships, half completed, on the stocks of the shipbuilding yards. I asked a Japanese gentlemen why they

were not being completed. With unusual freedom he told me that they were built speculatively and that buyers could not be found for them, except at prices ruinously below what the builders had expected. Even foreign purchasers, eager as they were for tonnage, were holding off for reduced prices.

There was a financial panic ashore, he told me. Shipbuilders and merchants had bought ahead considerable quantities of steel and other commodities, and were now facing a loss of 30 to 50 yen per ton. These people were facing a situation which was painfully new to them, and it was taking them all their time to meet it. The banks were tightening their loans and the godowns were

full of cargo that could not be delivered owing to the lack of money to pay for it. With such conditions ruling, he said, no one can think of buying ships, especially when they were already loaded with shipping shares. I reminded him of the great dividends that had been declared by a great number of the shipping companies, and the amount of money the larger firms had placed to their reserve funds. He smiled, and then replied that much of this reserve would be needed soon. The war was over, and very soon the foreign ships that used to sail to Japan would be back on their old routes again. He pointed out to me over a dozen British ships lying at anchor in the harbor. "There," he said,



YOKOHAMA WATERFRONT—MANY AMERICAN VESSELS DOCK AT THIS FAR EASTERN PORT



BUSY WATERFRONT SCENE AT HAKODATE, ISLAND OF EZO, JAPAN, IS SHOWN IN THE UPPER ILLUSTRATION—THE LOWER VIEW IS AN EASTERN SHIPPING SCENE TAKEN IN NEWCHWANG HARBOR, MANCHURIA

is the beginning. For three years I haven't seen over one British ship here at a time. What cargo went to Europe was carried by the Nippon Yusen Kaisha. Now there is about 60,000 tons going there in British bottoms."

The dozens of Japanese steamers lying in the harbor were there waiting for cargo. There was nothing for them and, despite the rustling of the brokers, sufficient goods could not be gathered together to enable them all to clear for sea. The uncertainty of the situation caused the shippers to hold back their freight.

War's Incentives Vanish

Now this all followed a time when shipowners were counting over their profits, and creating high ambitions for the future. Their schemes had to be dropped. What money they had made had to be carefully reserved. And now, when a certain amount of stability is setting in, they do not find the incentives that had existed during the war.

The capital raised for shipping during the boom was astonishing. From every quarter of Japan came millions of yen for shipping purposes. Business everywhere was prosperous. Money filled the coffers of the country to overflowing and so great was the excess that it took little persuasion on the part of the promoters to persuade the people to lend them money. Hundreds of concerns sprang up overnight and the eastern papers were crowded with announcements of new firms entering the shipping business in Japan.

But now a reaction has set in. Foreign orders are not being placed half so frequently as they were during the war. Therefore, many of the shipyards that sprang into being, like mushrooms in the night, and the industries born with them, will pass out of being. What, then, is to be the result?

Putting aside the large, well established concerns, the swarm of smaller fry will find themselves "up against it." Of course, they will make a bid for the China trade. But that cannot be captured in a day. For, arrayed against them are strong British interests, a slow and surely growing Chinese marine and, let us hope, a new fleet of American coasters will soon be dispatched to those waters to become a big factor in that trade.

Now a sign that should calm the fears of those who expect to see the Japanese make a ruthless freight cutting attack in the Atlantic and Pacific is the entrance of the Nippon Yusen Kaisha, the Toyo Kisen Kaisha, and other such important firms, into a

combination or working arrangement with the large British firms plying these oceans. This does not seem to indicate that a freight war is in prospect. On the other hand it points to the fact that they desire to maintain, as far as possible, the present standards. And behind this desire may be recognized the truth that the running of Japanese ships is not such a cheap affair as imagined.

In common with other countries, Japan is suffering from labor troubles and high prices. There, as elsewhere, are groups of profiteers who have preyed upon the people to such an extent as to cause discontent and, as in the case of the rice riots, serious trouble. Among the classes that expressed the most dissatisfaction at the end of last year were the men who "go down to the sea in ships."

Of this discontent, I have heard much from the secretary of the Marine Engineers association of China, who visits not only the members of his guild, but brings himself in contact with the officers of Japanese ships, as well. They expressed themselves as being determined to have their wages brought up to the standard of their European brothers, and their determination has already resulted in their being granted much better conditions and pay. The pay of a Japanese officer, though not yet equal to that of our own men, is a princely sum compared with former times.

Faces Rising Expenses

But this is not the only additional expense the shipowners have had to meet. The days of cheap repairs, cheap coal, cheap stores, etc., are over. Through increased cost of production and through their desires to have as large a share of the shipowner's profits as possible, the venders of these things have shot their prices sky high. And although the cost of stores and coal compares favorably with those we have to pay, the day is not long distant when the difference will disappear. This is due to the fact that Japan produces little that she needs. Therefore, she must buy most things outside her own shores, and here she meets competitive buying, such as she has never met before.

Concerning the American shipowner, most important is the competition he may expect from Japan in the Pacific. Undoubtedly they will endeavor to seize as much of the trade as they can. But one point in favor of the American merchant marine is the quantity of goods that must be exported over and above imports. It seems quite reasonable to hope that

the American shipowner will carry most of these exports. A sympathetic understanding between the American manufacturer and his brother, the shipowner, does not seem to be an unreasonable thing to hope for. In fact, it appears to be the duty of both to reach this understanding.

Where America Is Weak

Our greatest weakness in the Pacific is the passenger trade. Since that regrettable disorganization of the Pacific Mail Steamship company, the Japanese have had things mostly their own way. They put faster ships on the trade than those the Pacific Mail had left there, in addition using in competition with the latter the large steamers they had bought from them at the time of the disorganization. Consequently the Japanese made an easy acquisition of the human freightage. And not only to this country did they hold the right of way, but owing to the fine Canadian Pacific liners being called into national service, they seized the Canadian trade too.

Now, however, the Canadian liners are back, and are asserting themselves. Americans, however, are still awaiting the advent of their own liners, boats of speed and comfort which it will be a pleasure to travel in.

This article is not written in underestimation of Japanese competition. Competition undoubtedly there will be. But surely Americans are prepared to face it, and prove to the alarmists that it is not the serious thing they want us to believe it is. What has been stated here is the result of close investigation of Japan's progress. No one will deny that they have progressed. But I will voice the opinion that much of this progress is founded upon a basis that is none too strong. They had their chance during the war, and they made the best of it. But it now remains to be seen, since things are approaching normal again, how far they really have gone along the road of progress, especially in shipping. Time will soon tell us accurately. Americans are more than likely to find that they are not crowded out and that there is plenty of room for this new American merchant marine in every sea of the world.

Hog Island Site Sold

The United States shipping board recently announced that it had purchased the land upon which the Hog Island yard is built from the American International Corp. The statement is made that the transfer would have no effect on the work on the 28 steel cargo car-

riers and eight troopships now on the ways or on the 11 cargo carriers and four troopships that are in process of fitting out.

President M. C. Brush of the American International Shipbuilding Corp. says with regard to the work on hand at Hog Island:

"It will be at least Sept. 1 before we will be able to complete our contracts for 110 A type steel cargo carriers and 12 B type troop ships. The original contracts for the construction of ships at Hog Island consisted of 110 A type cargo vessels of 7825 deadweight tons capacity and 70 B type cargo carrying and troopships of approximately 8000 deadweight tons capacity.

"Shortly after the signing of the armistice and for several months thereafter some of the troopship contracts were canceled, until finally, last August, a total of 58 of the 70 cargo carrying and troopships had been canceled, leaving 12 to be built.

"The program now in operation at Hog Island is to construct a total of 110 of the A type ships and 12 of the B type ships. Of this total of 122 ships, 86 have been launched, leaving 36 to still be launched, which 36 ships are now on the ways. Seventy-one of the 86 ships launched have been delivered to the government and have left the yard, leaving 51 to still be delivered."

Lake Distance Tables

A distance table of the Great Lakes was recently published by the Lake Carriers' association. This table is in book form and is accompanied by a table in chart form, suitable for framing and posting. The book contains 600 pages and gives distances from each port to all other ports. Upbound and downbound distances are shown, the separate courses in Lakes Superior and Huron and in the St. Marys and Detroit rivers being taken into consideration wherever they apply. For western Lake Michigan ports distances by northabout and southabout courses are also shown. Definite points of departure are given where necessary and care has been exercised to have all distances accurately measured and checked.

Two copies for each steamer (one for the pilot house and one for the engineroom) and one for each barge, each with the name of the vessel stamped thereon, are being distributed free of charge, together with distance tables in chart form. Any additional copies required for the offices may be had on application. These will be charged for at the rate of \$5 each, including the wall chart.

Problems of the Vessel Operator

Cape Cod Canal Closes for Want of an Owner—Plan World-Wide Wireless Service—Federal Division Moves to New York

THE Cape Cod canal which forms an important link in the coal route from Norfolk, Va., and other southern points to Boston, has been in the limelight during the last few months on account of the condemnation suit instituted by the government to determine a purchase price for the property. The government was willing to pay \$8,250,000, but a jury last year placed a value of \$16,801,201, which being over twice the government's price, has held the property in abeyance ever since.

On March 1, with the turning back of the railroads to private ownership, the government attempted to turn back the Cape Cod canal property to its original owners. However, the owners took the stand that they had not been recompensed for the use of the canal and that their accepting it at this time from the government might have an annulling effect upon their claims. They refused to take over the property. With New England railroads tied up by severe weather as never before, and industries in many cases on the point of shutting down, due to shortage of fuel, the canal offered practically the only source of relief to the situation. In the absence of any owner, the canal was forced to close down during several days in the early part of March and a fleet of coal-laden vessels was delayed in transit to Boston as a result. The governor of Massachusetts and others brought pressure to bear upon the authorities at Washington and finally persuaded the old company to start operating the canal.

The importance of the canal in relation to New England industries has thus again been brought to public notice and undoubtedly the question of government purchase of the property will be brought up in the near future. During 1919, 2,800,000 tons of coal passed through the canal.

World Wireless Service

Edward J. Nally, New York, for many years interested in the development of communication service and long vice president and general manager of the Marconi Wireless Telegraph Co. of America, has been elected president of the Radio Corp. of America, which is arranging for a worldwide wireless service. The other

officers are: Owen D. Young, chairman of the board; Charles J. Ross, secretary and controller; George S. De Sousa, treasurer; Lewis MacConnach, assistant secretary; Marion H. Payne, assistant treasurer, and John W. Griggs, general counsel.

The directors include Gordon Abbott, chairman of the board, Old Colony Trust Co., Boston; Albert G. Davis, vice president of the General Electric Co.; John W. Griggs, formerly attorney general of the United States and governor of New Jersey; Edward W. Harden, of the firm of James B. Colgate & Co.; Edward J. Nally, president of the Radio Corp. of America; Edwin W. Rice Jr., president of the General Electric Co.; James R. Sheffield, of the firm of Sheffield & Betts, and Owen D. Young, vice president of the General Electric Co.

Mr. Nally has made the following statement regarding the aims of the new corporation:

"The principal aim and purpose of the Radio Corp. of America will be the establishment and maintenance of transoceanic and long distance overland communication.

"The Radio corporation has been greatly strengthened through its connection with the General Electric Co., by reason of which it will have available for its use the valuable wireless apparatus recently developed by the General Electric Co., the principal device being already widely known as the Alexanderson high frequency alternator.

"Through agreements made with the Marconi Wireless Telegraph Co., Ltd., of England, new powers and privileges are granted the Radio corporation extending its scope of activity and providing among other things, for the formation of a South American company to be managed by it. The Radio corporation will own the majority of stock in various companies which will construct stations in South America for communication with the United States and England and in due course with other countries.

"It is confidently expected that this will be the forerunner of similar plans for the further extension of transoceanic wireless. Thus the Radio Corp. of America, under traffic arrangements with the British company

and others, will be enabled as soon as its stations are returned by our government to start traffic with the British Isles, Norway, France and Japan, in addition to the South American project already referred to.

"Under new conditions of financial strength and in possession of the engineering resources of the General Electric Co., with a departmental staff of exceptional experience and ability, the company expects to attain the great objective for which it has always aimed, namely, a worldwide system of commercial wireless communication.

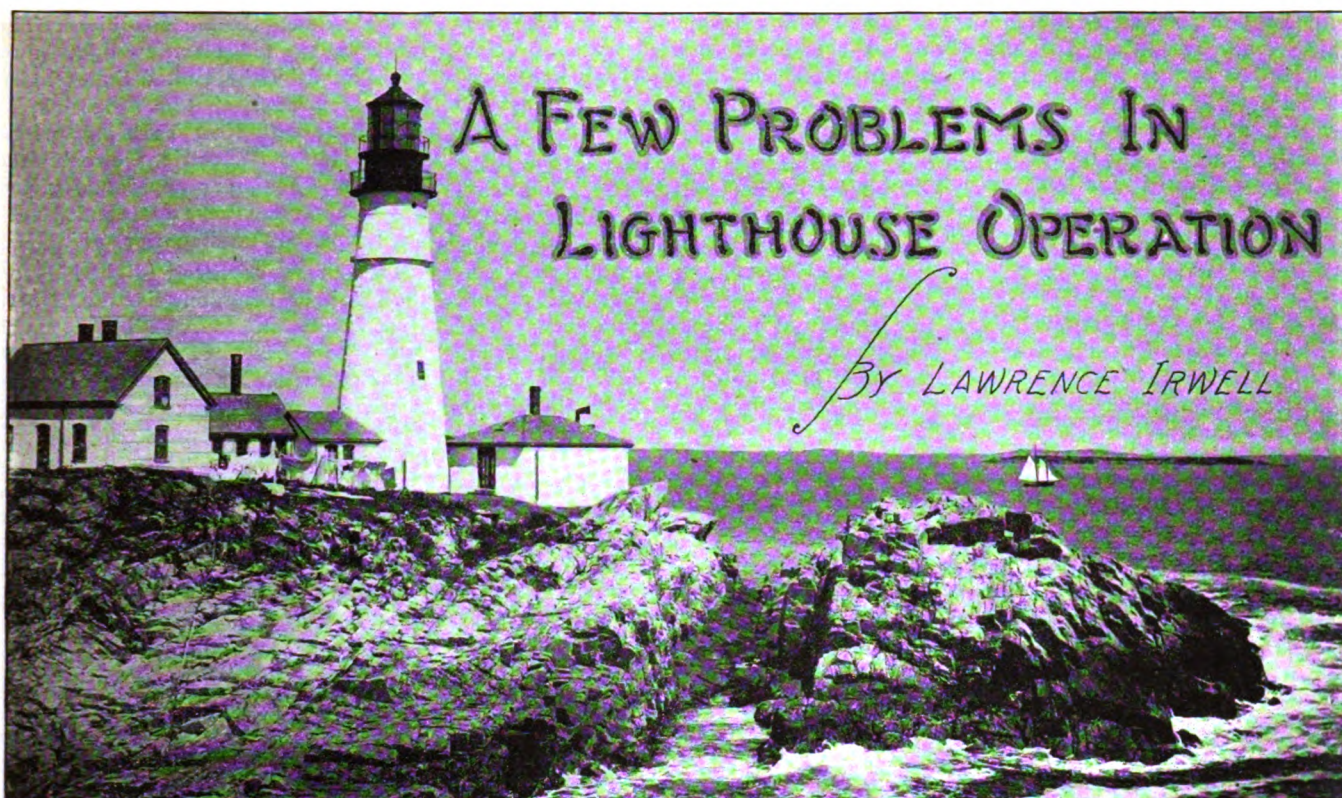
"In accordance with what is understood to be the wishes of the United States government, effective means have been taken to see to it that the actual control of the Radio corporation shall at all times remain in the hands of loyal American citizens or corporations."

Moves Offices

The division of operations of the United States shipping board will be moved from Washington to New York as promptly as possible, and consolidated with the New York section of the division. Chairman Payne, in explaining the motive for the move, said that more than 60 per cent of the activities of the division are in and about New York City, and that by this consolidation a saving of about \$500,000 will be effected. About 200 employees are in the Washington office and approximately 400 in the New York office.

Teach Overseas Commerce

The College of Overseas Commerce, recently opened in San Francisco at rooms 569-575 Flood building, will give practical instruction in trading with foreign markets. A concise course for two months, covering processes and documents in export transactions, commerce with the Orient, marine insurance, operation of foreign exchange and commercial relations with Latin America, has been arranged. The object of the course, it is set forth, is to impart practical information on the above subjects so that graduates will be enabled to handle problems in overseas commerce intelligently.



Portland Head Light, Portland, Me. This is a typical, well-known Atlantic coast lighthouse of the older type and was built in 1790



Heligoland Light

VERY lamp that shines on shore or at sea, with the trivial exception of a few carried for doubtful economical reasons by small, antiquated coasting ships, results from

the oil without a corresponding increase in the consumption. The argand, or ordinary circular wick lamp, was the outcome. This lamp was improved by the carcel process of pumping oil into the burner, so that, by overflowing, the oil around the wick was maintained at an unvarying level. Owing to the uniformity of the light obtained by this method, the carcel lamp was adopted as the photometric standard.

The more complete the combustion of the oil, the greater the light obtained. Four concentric wicks, with air spaces between, and a larger and longer glass chimney to increase the light, give with a vegetable oil 23 times the amount of light of the ordinary argand and consume only 19 times the quantity of oil. However, good and effective these lamps may have been considered years ago, they are hopelessly outclassed by modern lamps. Kerosene had such advantages over colza—a vegetable oil—not the least being that it is cleaner, and does not thicken or congeal with cold, that its adoption for lighthouse use was a matter of course, especially when it was found that incandescent mantles could be used over the vaporized oil.

The means of projecting light in the right direction are of equal importance with the lamps themselves. The French investigator Fresnel (1788-1827) discovered how to give the necessary lenses a short focal length without reducing their diam-

eter, and he was probably the first to construct the lens "in steps," the principle universally adopted alike for lighthouse illumination and ships' sidelights. Anyone can understand the principle by examining the corrugations on the lenses of ship lamps. It was found that the combination of the lamp with several concentric wicks and the fresnel lenses was equal to 4000 single argand lamps without optical apparatus, and was eight times greater than any light produced by the reflectors then used.

Whatever the illuminant, it is essential that the greatest possible amount of light shall be derived from it. The distance at which a light is visible is determined by its height above the sea level at high water, and by the curvature of the surface of the earth. The light, to be useful, must be easily discernible at its horizon in ordinary weather. The beams of light given off by the flame, or incandescent mantle, which are thrown out equally in all directions, except almost vertically downward, must be collected and directed back by reflectors. Even with these reflectors there would still be a tremendous waste of light, so the beams are further concentrated and diverted toward the horizon by prisms set above and below the lens of the lantern.

The use of parabolic reflectors only is called the catoptric method, that of prisms the dioptric, and that of the two combined the catadioptric, though the second term is often in its gen-

scientific study of light and of laws governing refraction and reflection.

The lighthouse is an ancient institution, but until comparatively recent years it was of limited usefulness. The first great forward step in its development was when engineers discovered how to build lighthouses on submerged rocks, Winstanley's Eddystone, on the south coast of England, finished in 1700, showing that this could be done. The second great improvement was in the means of illumination made possible by oil lamps. Great as the advance has been of recent years, and perfect as the present lamps seem to be, the probability is that finality has not been reached. Even the third Eddystone lighthouse (1759), usually known as Smeaton's, was lighted with 24 candles. The present light of this old lighthouse is dioptric of 292,500 candlepower and is visible for 17 miles.

No sooner had the superiority of oil over candles as a lighthouse illuminant been admitted than experiments were made to ascertain whether a greater light could be obtained from

eral application inclusive also of the third category. Many of these reflectors are 2 feet in diameter across the mouth, and some of the most modern and most powerful are considerably larger. As they are made of copper, tested for curvature by gages to a nicety, and are heavily silvered, in the proportion of about 6 ounces of silver to 16 of copper, it is evident that their production requires careful manipulation.

Much depends on the correct adjustment of the reflector to the lamp. The focus of the reflector must coincide with that part of the lamp flame where the light is brightest. The prisms and lenses forming the lantern are usually (though not always) arranged in octagonal form. In an ordinary lighthouse lamp of the first rank, about 45 per cent of the light passes through the refracting lenses, a little more than 22 per cent through the upper prisms, and between 13 and 14 per cent through the lower prisms. These unite to send a beam of light to the horizon, about four-fifths of the light produced being utilized.

Frames Involve Important Details

The steel frames, in which the lenses and prisms of the enclosing lantern of the lighthouse lamp are held, must be constructed so that they do not coincide with those of the lenses and prisms themselves. Otherwise a black intersecting line would be formed across the light. The importance of this provision to the mariner is obvious.

The Fastnet light, on the southernmost point of Ireland, is white flashing, of 750,000 candlepower. It is visible for 19 miles. The focal plane of the Cape Race lighthouse, southeast Newfoundland, is 165 feet above sea level.

The Cape Race apparatus with its incandescent burner is probably equal, and perhaps superior, to any other lenses of similar focal distance. The apparatus is rotated by clockwork actuated by a weight of about 900 pounds, which has a fall of 14½ feet per hour. The optic makes one complete revolution in 30 seconds, producing a flash of three-tenths of a second duration every 7½ seconds. The illuminating apparatus consists of an incandescent kerosene vapor burner with a mantle 85 millimeters in diameter. The introduction of these burners made possible the increase of the candlepower by more than 300 per cent in comparison with the intensities obtainable with the older forms of concentric wick burners. The burner does not revolve with the apparatus. Access to the burner is obtained by means of a ladder

fixed within the pedestal. The power of the beam emitted is more than 1,100,000 candles, or 1100 lighthouse units, and its range is almost 20 nautical miles.

Candles were used in early lighthouses in the United States, at Boston harbor in 1716, for example. Later, fish oil was burned in spider lamps and afterward sperm oil was employed, chiefly in a sort of argand lamp in Winslow's magnifying and reflecting lanterns. As sperm oil became more and more expensive, search was made for a less costly illuminant. It was found that colza, an oil pressed from seeds of wild cabbage and other plants, was used in France and Great Britain, and would fulfill all conditions. The cultivation of the necessary plants in the United States was stimulated and also the manufacture of the oil from the seeds.

Later experiments with lard oil were made with such success as to prove that this kind of oil of a certain grade was a more desirable lubricant than colza as it was more certain in quantity and production. It was also lower in price. Lard oil, therefore, became the next established illuminant.

The use of petroleum, however, had attracted attention prior to 1850, and in 1885 the United States lighthouse board made some unsuccessful experiments with it. Meanwhile the price of lard oil had so increased that some other illuminant became a necessity, and, as kerosene was in successful use in European lighthouses, the board renewed its experiments with petroleum. The first difficulty encountered was that of the lamp in which it could be burned with satisfactory results. This was eventually overcome by the production, in the board's own laboratory, of a lamp that, for the time being, fulfilled all requirements.

Practically all the important coast stations now use kerosene as the illuminant, by means of the incandescent oil vapor system. The plant at each station consists, briefly, of a tank containing the kerosene under high air pressure, maintained by a hand pump, and suitable tubing through which the oil is forced from the tank to the lamp. The lamp consists of a vaporizer, bunsen burner, and a mantle under which the vaporized oil is burned, producing a brilliant incandescence. In selected localities, other forms of illuminant are used such as compressed-oil gas, or acetylene, and self-generating acetylene apparatus which generates gas from calcium carbide.

Electricity has been tried in some lighthouses, and it has been found

suitable under certain conditions. The most powerful electric light now maintained by the United States lighthouse service is that at Navesink, at the entrance to New York bay, which consists of an electric arc exhibited through a lenticular apparatus, giving a white light every 5 seconds, with an estimated candlepower of 25,000.

The most northerly lightship off the United Kingdom is the North Unst, built on top, with not much room to spare, of a crag called Muckle Flagg, a mile beyond the Shetlands. The rock rises precipitously, and on its northern side almost vertically, from the water for about 200 feet. Perched above is the lighthouse tower. Its red and white light is visible 21 miles away. Even at its great elevation, the lighthouse is lashed by the spray in the winter gales.

Portland head light, which is shown in one of the accompanying illustrations, was built in 1790. It is mounted on a stone tower, the height of the lamp being 101 feet above mean high water. It is equipped with a Funk mineral oil-burning lamp the rays of which are visible for 20 miles.

While Portland head light was built 130 years ago, it is not the oldest light on the Atlantic coast, as Boston light, situated at the entrance of Boston harbor, was first lighted in September, 1716. The present light was built in 1783, the height of the tower being increased in 1859. It displays an incandescent oil-vapor light giving a white-flash of 100,000 candlepower every 30 seconds, visible for 16 miles.

Special Libraries

Due to the fact that a directory of the special library collections of the United States is not available, the Special Libraries association is compiling such a list. The association requests information concerning special libraries throughout the United States, a special library being defined as a collection of information either on a specific subject or field of activity. The association requests that data on such collections be sent to William F. Jacob at the General Electric Co., Schenectady, N. Y.

Germany's loss of submarines during the war has been officially computed at 202. The average rate of loss among German submarines increased from one boat in five weeks during 1915 to one in five days in 1918. The proportion of submarines lost during the war to the number in commission was approximately 55 per cent.

American Shipyards Are Active

**Puget Sound Yards Are Building Vessels for Private Account—
Skinner and Eddy Yard Reorganizes—Launch Ship at New Orleans**

THE first private contracts for steel ships awarded on Puget sound since the completion of the government construction program have been taken by J. F. Duthie & Co., Seattle. Two 2350-ton steel steamships will be built for the Coastwise Steamship & Barge Co., James Griffiths & Sons, agents. One of these vessels is to be used in coastwise trade between Puget sound and British Columbia and the other is intended for service between Great Britain and France, carrying coal and towing barges. Steel for the construction of these vessels has been ordered and they are expected to be delivered in the early summer. Griffiths & Sons are pioneers in freighting and towing in north Pacific waters. The new vessels are to be constructed along lines for general freighting and towing, based on years of experience and on the records made by other units of the same fleet.

Builds Standard Steamers

Two 7500-ton standard steel steamships are to be built by the Todd Dry Dock & Construction Co. at the Tacoma, Wash., plant for its own account. This company has six ways, four of which are still occupied by government contracts. The two hulls for company account are being built on the two ways on which government contracts have been finished. Announcement to this effect has been confirmed by President C. W. Wiley. No further details have been made public but the company will prosecute construction with speed. The 7500-ton type of vessel built at this plant has proved highly successful and it is thought that the new vessels will likely be sold before they are ready to launch. The same company is building three big scout cruisers for the United States navy. The destroyer GWIN, the launching of which was a naval secret two years ago, has been accepted by the navy and is now in service. She is an excellent vessel.

Todd Drydocks Inc. at the Seattle plant have completed extensive overhauling and alteration on the Japanese built steamship EASTERN GUIDE and a similar contract on the EASTERN GALE is almost complete. The same yards recently finished a big repair job on the steamer CITY OF TOPEKA which was fitted with a new stern frame and other work done at a cost of \$25,000. The same yard is altering the stern wheeler BAILEY GATZERT and is now drydocking the

12,000-ton steamship M. S. DOLLAR, formerly the WAR KING. The three large docks of this plant are being kept constantly in use.

After a trip to Great Britain, Capt. J. W. Troup, manager of the British Columbia coast service of the Canadian Pacific railroad, has returned with the statement that the Clyde shipyards are so busy that they cannot take additional contracts at present. Captain Troup tried to buy completed tonnage, because of the impossibility of obtaining early delivery for new contracts, but he found nothing that would suit. Consequently it is possible the Canadian Pacific railroad will place some contracts with Pacific coast yards.

It is reported that the Emergency Fleet corporation has offered to award the Northwest Steel Co., Portland, Oreg., contracts for ten 10,000-ton steel oil tankers if that company will relinquish a claim against the government for \$3,000,000 due to cancellation of previous contracts.

With the launching of the steamer WEST JAPPA on Feb. 19, the last contract for the government was sent into the water by the Ames Shipbuilding & Dry Dock Co., Seattle. The WEST JAPPA is the twenty-fifth carrier built for the government at this plant. New work is expected but no contracts have yet been signed. Two more steel vessels are to be launched in March, one by the Duthie yards, Seattle, and one at the Todd yards, Tacoma, Wash.

The National Oil Co. has purchased from the government five wooden hulls now lying in Lake Union, Seattle, for a total reported to be \$750,000. These vessels are to have machinery and boilers installed and finishing work done at the yard of Meacham & Babcock, Seattle, which has been idle for several months since the latter company completed its building program for the Emergency Fleet corporation.

Reorganizes Yard

With the completion of its government construction and four carriers for the Robin Steamship Co., the Skinner & Eddy Corp. ceased to function as a shipbuilder and was succeeded by the Skinner & Eddy Shipbuilding Co. The sale made during December but announcement was not made for some time thereafter. The property involved is only Yard No. 1, the original Skinner & Eddy plant. The com-

pany's immense floating drydock is included in the sale and the new corporation will continue in general building and repair work. Yard No. 2, formerly the Seattle construction & Dry Dock Co., is not involved in the transfer.

The new company is formed of a number of executives of the older corporation. D. E. Skinner and John W. Eddy retain only a small interest in the new company, but the former has been elected president. The Skinner & Eddy Shipbuilding Co. is owned mainly by Victor H. Elfendahl, Henry G. Seaborn, Thad Sweek, Louis Titus, M. H. Keil, Lawrence Cunningham and George Royal. These young men have all been closely identified with Skinner & Eddy for years. Mr. Seaborn is vice president of the new company. Mr. Sweek, treasurer in the old company, assumes the same position in the new firm. Mr. Elfendahl, formerly assistant to the president, is secretary of the new company. Mr. Titus has been the company's eastern representative for a long time and Mr. Keil is consulting engineer holding the same position under the Skinner & Eddy company's reorganization.

Launches First Ship

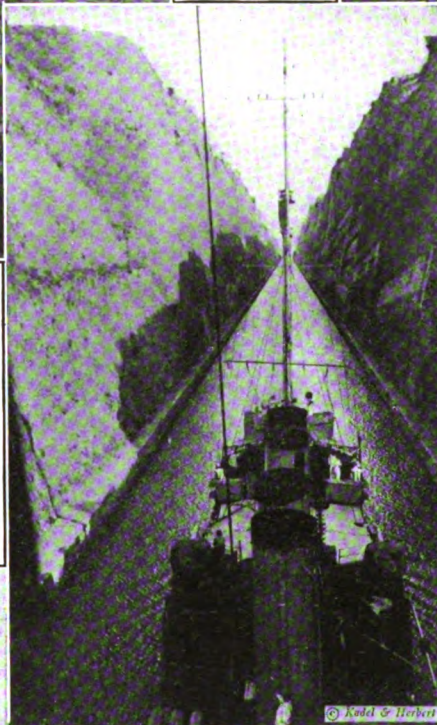
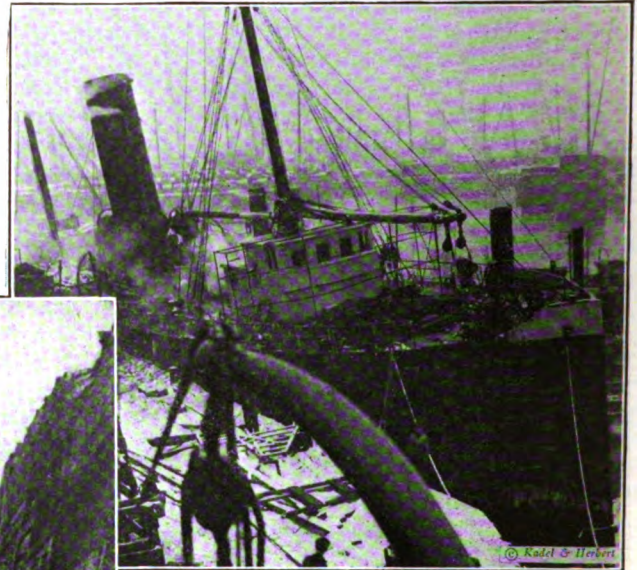
Doullut & Williams Shipbuilding Co., Inc., launched the first ship from its New Orleans yard, recently. The vessel was launched sidewise into the Industrial canal and was christened NEW ORLEANS. The vessel is of the Isherwood type with the following dimensions: Length, 412 feet; beam, 53 feet; molded depth, 37 feet; launching weight, 2800 tons; speed, 11 knots; cargo capacity, 9600 tons; steel in ship, 2620 tons; rivets, 600,000; horsepower, 2800; fuel, coal and oil; seven watertight bulkheads and five cargo hatches. The steel was fabricated at the plant of the Virginia Bridge & Iron Co., Roanoke, Va., and the ship was built under a "lump sum" contract, for \$1,760,000 for the United States shipping board. Approximately 3000 persons were employed in the construction of this and three other sister ships now nearing completion in the Doullut & Williams yards. Only boilers and turbines remain to be installed. This is the largest ship ever built south of Newport News, Va., with the exception of one constructed in Florida. The company's contract calls for seven other ships of the same type.

Latest Marine News in Pictures

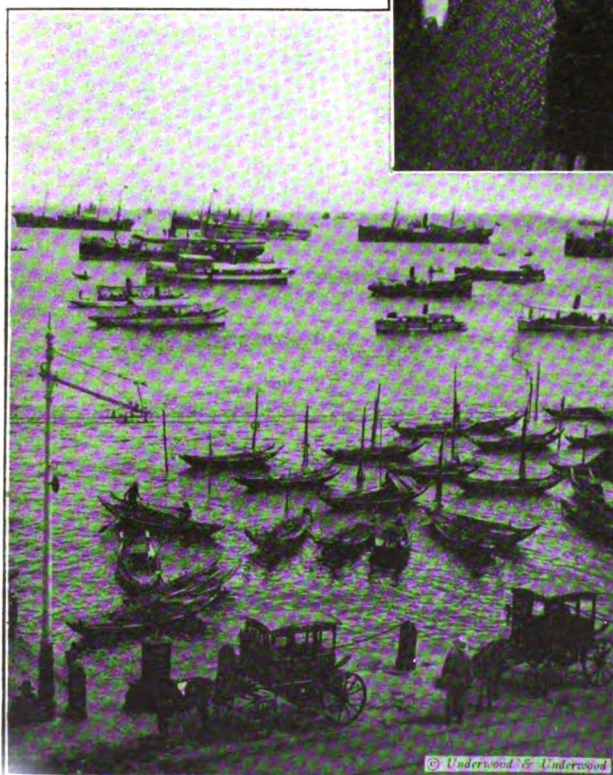


"A pretty view," said the Americans wintering in Havana recently as they observed the American steamer Kanabec aground a few hundred feet from the Miramar hotel. "A pretty predicament," murmured the captain. The liner was laden with coal, and grounded in 20 feet of water.

"Even a ship will list with too much liquor aboard," remarked the photographer as he "snapped" the freighter Yarmouth, laid up at New York after a perilous attempt to reach Havana. The ship sailed with a cargo of intoxicants just before the "dry" law went into effect. Caught in a storm, her hundreds of cases of "bottled goods" were shattered, and she barely managed to "stagger" back to port.



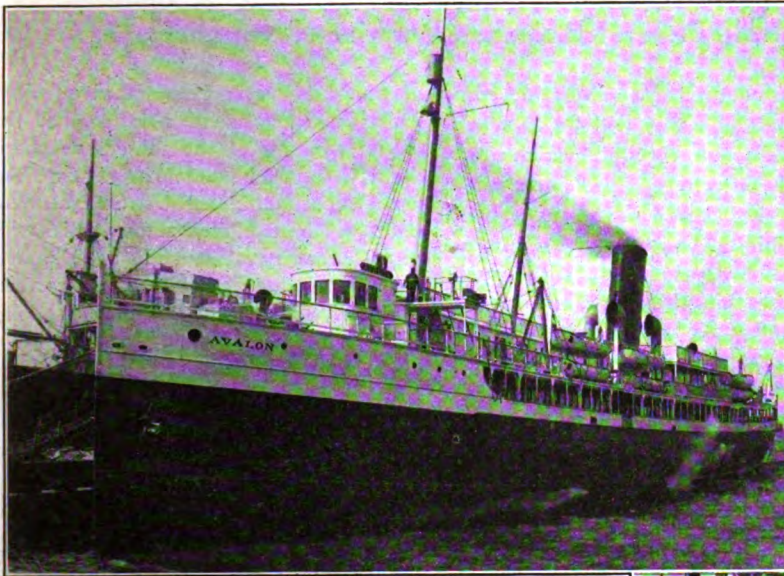
The United States destroyer Barney recently made a trip through the famous Corinth canal of Greece. The canal is noted for its exceptionally high walls and picturesque scenery. It stands high in importance among canals of the world. It leads into Athens and is sometimes referred to as "the short cut of Greece."



Mystery is said (notice "is said") to surround the sinking of the steamer Moccasin at the foot of Columbia street, Brooklyn, recently. The Moccasin was formerly a German liner, taken over and fitted out for South American trade.

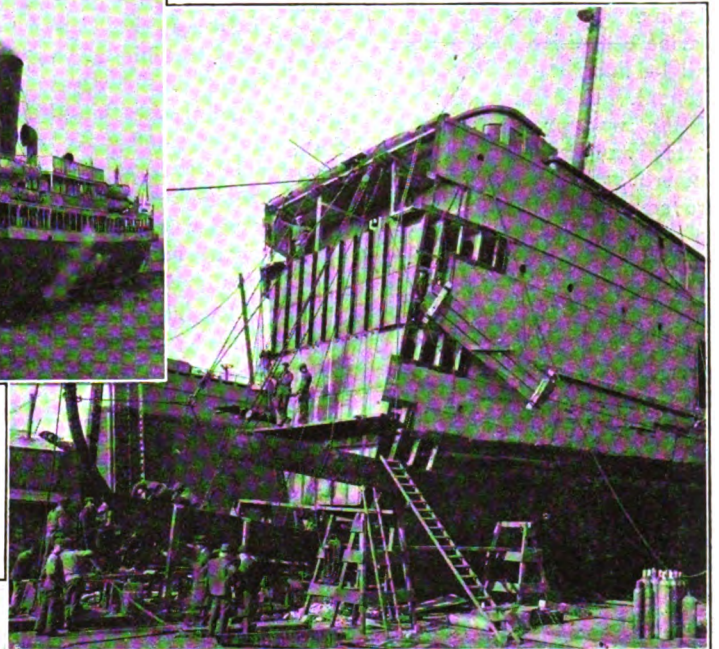
East meets West in the harbor of Singapore, the big and busy metropolis of the Straits Settlements

Photographs From Far and Near



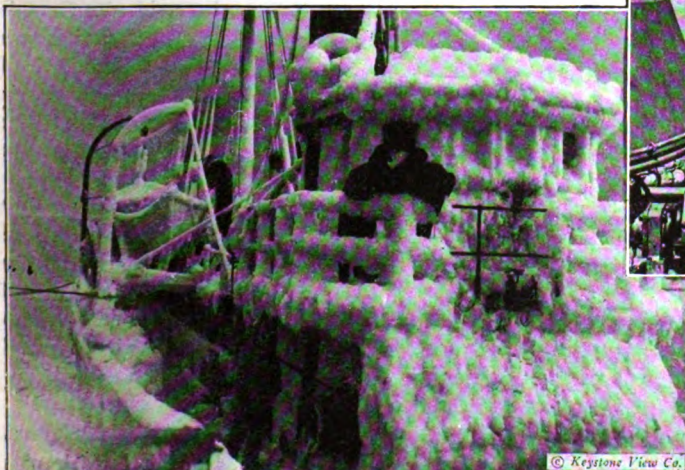
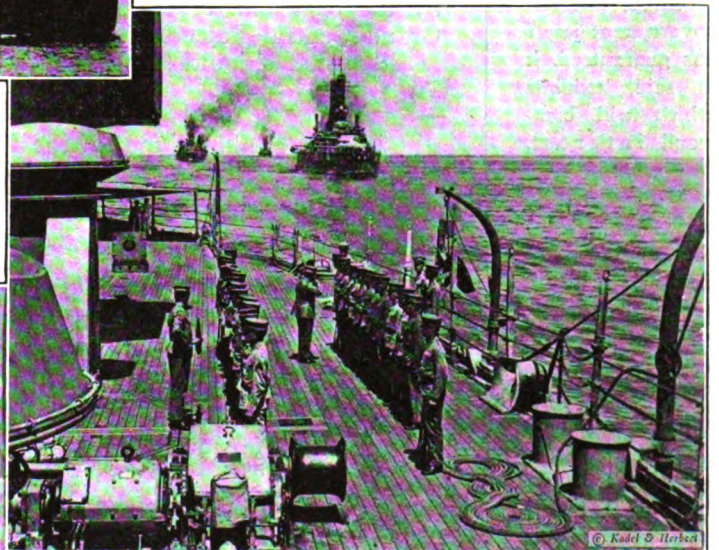
Here is a remarkable "testimonial" to the skill of modern ship surgeons. Bow and stern of Avalon were amputated so that she might pass through the canals, above Montreal, on her way from Chicago to Boston for remodeling as a troop ship, and then—

When the armistice was signed the government had no further use for Avalon, and she was sold just as she had come from Chicago, minus bow and stern. At the Morse Dry Dock & Repair Co.'s yards new ends were "grafted" on. She is for Santa Catalina service.



"The ship that sold for \$1," as she is referred to, is the Thomas J. Scully, formerly used by the American navy as a patrol boat off Brest, France. Recently she was turned over to the New York police department for \$1.

Down at the Boston harbor the other morning there was a good deal of eye rubbing when Foam was docked. She looked as though she had just arrived from a voyage to the North Pole, with ice rails, masts and rigging sheathed in ice.



This official navy photograph shows the Atlantic fleet on its way to Guatnamo for maneuvers. Here marine inspection is in progress on board the Pennsylvania

Marine Show Arouses Interest

Manufacturers of Marine Equipment Join Shipping and Shipbuilding Companies in Extensive Exhibits—Three Federal Branches Promise Novel Displays

WITH a powerful searchlight, a product of the Sperry Gyroscope Co., from the roof of the Grand Central Palace, New York, playing upon the streets, the first marine exposition held within 20 years will be inaugurated the week of April 12 next. This searchlight is but one of the war products of the United States and but an incident to the numerous marine inventions and improvements which will then be placed on view for the first time. As a commercial proposition, this exposition already promises to be one of the largest affairs of its kind ever held in this country, over 150 manufacturers, shipbuilders and steamship lines and related companies already having procured space to exhibit. Its educational influence, however, will not be diminished by the commercial atmosphere as not only will the various organizations of seamen and maritime publishers be represented, but the government itself has guaranteed, it is said, exhibits which will command interest. In addition to the department of commerce and the shipping board which promised to exhibit some time ago, the navy department has since procured space to place on display some things which have never before been disclosed to the general public in the center of the main floor of the great exhibition hall, the navy has promised to erect

the superstructure of a submarine conning tower. To this will be attached a real periscope through which persons and objects on the mezzanine floor can be viewed. The navy will also exhibit a paravane, the instrument which was used with such great success in the war zone to cut loose and recover enemy mines. The paravane is now the accepted equipment of all vessels of the navy and was used extensively on merchant ships while the mine danger was greatest.

The navy has also offered to exhibit a model of a Ford eagle boat and other models which, owing to the necessities

of war, have never been placed on view. This department will also display the official painting of the famous seaplane, the NC-4, which successfully made the first transatlantic flight. Several war relics will be exhibited among which will be a German naval gun. In addition, the navy will include exhibits of its recruiting service and naval hospitals.

"I have always been a warm advocate of a large American merchant marine," said Secretary Daniels in announcing the intention of the navy to join in this exposition," as the merchant marine and the navy are so closely allied, and I hope this first national marine exposition will be most successful."

The celebration of fuel day, which

occurs Friday, April 16, has been placed in the hands of a committee of prominent coal and oil men, headed by F. S. Staly, president of the Fuel Oil Engineers association. The other members include H. C. Matlack, of the Matlack Coal & Iron Co.; C. C. Smith, assistant general secretary of the American Petroleum institute; Linton C. Bates, consulting engineer; and Frank Shipman of the Texas Co.

"I am glad," said A. C. Bedford, chairman of the Standard Oil Co., when informed of fuel day, "that plans for the national marine exposition will be realized in the week beginning April 12. The United States finds itself in possession of a huge fleet of American built ships without a

Program for Marine Week

FOLLOWING is the main outline of the program for national marine week, April 12-17, to be observed in connection with the national marine exposition at the Grand Central Palace, New York. More than 150 exhibitors have reserved space. The exhibit, of course, will be open daily.

Monday, April 12

1 p. m., inaugural luncheon aboard an American ship in New York harbor, at which the ceremonies of the week will be opened formally by the secretary of commerce and the chairman of the shipping board.

4 p. m., formal opening of the National Marine exposition by the chairman of the shipping board at a private viewing Grand Central Palace, New York.

8 p. m., shipbuilding night at the exposition.

Tuesday, April 13

7 p. m., annual dinner of the National Marine league, Commodore hotel, New York. Speakers will include the secretary of the interior and the chairman of the shipping board.

Wednesday, April 14

8 p. m., engineering night. Special lectures and motion pictures at the exposition.

Thursday, April 15

8 p. m., travel night. "Travel in American Ships" featured as a slogan at dinner and celebration under the auspices of the Travel Club of America.

Friday, April 16

8 p. m., fuel night. Special lectures and motion pictures at the exposition.

Saturday, April 17

1 p. m., merchant mariners' luncheon, New York.

8 p. m., merchant mariners' night. Special films and features to stimulate recruiting of Americans for the merchant service.

clearly defined program of operation. It is vitally important to the nation that we do not let the opportunity afforded by the accident of war to regain our rightful position as a maritime country slip through our fingers for lack of appreciation on the part of the public of the value of a real American merchant marine. I am sure that the exposition will do a great deal to inform people of the continued efforts necessary to maintain the position on which we have but a precarious hold at the moment."

Plans Engineers' Day

A committee to take charge of engineers' day, for Wednesday, April 14, has also been formed. It is composed of H. L. Aldrich, chairman; William T. Donnelly, naval architect and marine engineer; Capt. C. S. McAllister, secretary of the shipping board committee to revise the navigation laws; and Walter MacFarland, authority and writer on marine engineering. In a word to marine engineers, R. T. Crane Jr., president of the Crane Co., Chicago, declared:

"It is my opinion that you are on the right track and that you have a splendid opportunity, through the national marine week, to center the attention of the people of the country on the necessity and importance of having an American merchant marine. Our ships should sail the seven seas in ever increasing numbers if we are to maintain our standing among the nations of the world."

The promoters of national marine week have been unusually successful in winning support from members of congress. The social functions planned for the week of the exhibit will be centered around these statesmen and they will be called upon to address all of the public meetings. Sanctioning the efforts of the National Marine league in staging a nation-wide celebration during the week of the New York exhibit, Senator Sheppard of Texas said:

"I wish the National Marine league unqualified success in its most laudable efforts to develop a suitable merchant marine."

Senator Calder of New York said: "Thinking men must appreciate that a merchant marine of size and quality is an undoubted necessity for the development of our foreign commerce. We have one now, and while the opportunity is here, we should care for it and encourage American operators to continue these ships in operation under the American flag."

Governor Smith of New York said:

"In the days before the Civil war, no better built, swifter or more skillfully handled ships than those of America sailed the sea. Let us bend all our energies to keeping the place which the ingenuity and skill of American shipwrights and masters have recently regained for us. Let every citizen adopt the slogan—American Goods in American Bottoms."

"I heartily commend the efforts of the National Marine league in the promotion of the best interests of the American shipping industry. As the advent of steam navigation was an element in clearing the clipper ships from the seas so will the oil burning and electrically driven ships of the future supersede steam. This circumstance has been brought about largely through the ability of American labor. Let us keep America to the fore."

Congressman Lehlbach of New Jersey said:

"The setting aside of a national marine week for the purpose of arousing public interest in the American merchant marine is an excellent idea. It will bring to the attention of the American people not only the desirability of keeping our flag afloat on the seas, but the necessity of intelligent effort to achieve this end."

Congressman Curry of California said:

"No nation can be internationally commercially great regardless of its wealth that is compelled to depend on foreign shipping to carry its commerce. In time of war the navy will not be nearly so efficient if the nation has not an adequate merchant marine, as it would be with an efficient and extensive merchant marine, to aid the navy and to transport the army. The recent war demonstrated this fact."

Senator Fletcher of Florida said:

"I wish you every success in your effort to arouse public interest in the thorough establishment of an adequate American merchant marine. It is not enough to build ships. It is important to get the public interested in ships and shipping, financially and otherwise. They will become interested when they understand the subject and realize the situation. We may have ever so strong an army and navy, but we are in a weak and dependable position unless we have under our flag, American owned and American manned, adequate merchant shipping."

John Barrett, director general of the Pan-American Union, said:

"From my standpoint as the executive officer of the Pan-American union, the official international organization of American republics devoted to the

development of commerce, intercourse, friendship and peace among them, I am, of course, profoundly interested in the celebration of national marine week and the influence it may have in providing better shipping relations between the United States and the principal ports of the 20 Latin American countries."

"For long years I have advocated the development of the best shipping facilities possible between North and South America as a most important influence in building up Pan-American trade and Pan-American friendship. The improvement of conditions has been extremely slow and the remarkable development of conditions has been extremely miraculous in spite of this heavy handicap. The future, however, of the commercial relations between the United States and its sister countries and peoples will depend so much upon there being a sufficient supply of freight, passenger and mail steamships that, if the situation is not cared for comprehensively and satisfactorily in the near future, the United States may lose the notable position of leadership it now has in Pan-American trade and give way permanently to the competition of Europe and even of Asia."

"The solidarity of the western hemisphere, so thoroughly developed both economically and sentimentally during the world war, can only be preserved through prompt facilities for both trade and travel. Whatever, therefore, may be accomplished along this line by the National Marine league and by the celebration of national marine week will be in behalf of the general cause of practical Pan-Americanism."

Issues Register

The 1920 edition of *Hendricks Commercial Register* of the United States has recently been published. This volume, which is the twenty-eighth of its kind to be issued for the benefit of buyers and sellers, is compiled by the S. E. Hendricks Co., New York.

The work carries an exterior index through the medium of three colors on the front edge, white, red and blue. The blue section is the trade index containing 162 pages in which every product listed is cross indexed for quick reference. The red section is the main classified trades list containing 1813 pages and listing over 1800 products. The white section contains 216 pages and carries a list of the trade names under which various products are manufactured with the names and addresses of the manufacturers.

Late Flashes On Marine Disasters

Brief Summaries of Recent Maritime Casualties—
A Record of Collisions, Wrecks, Fires and Losses

Name of vessel	Date	Nature	Place	Damage resulting	Name of vessel	Date	Nature	Place	Damage resulting
Aghia Paraskeri	Feb. 24	Sank	At sea	Total loss	Lucovar	Feb. 18	Disabled	At sea	Not stated
Alexandrian	Feb. 21	Broke shaft	At sea	Not stated	Luhaina	Mar. 1	Damaged	At sea	Not stated
Associate	Feb. 20	Sank	At sea	Total loss	Luerie	Feb. 23	Broke steering gear	At sea	Not stated
Alabama	Feb. 19	Grounded	Chicago	Slight	Launberga	Feb. 19	Leaking	At sea	Not stated
Ajax	Feb. 25	Engine trouble	At sea	Slight	Lewis K. Thurlow	Feb. 20	Broke propeller	At sea	Not stated
Avondale	Feb. 17	Engine trouble	At sea	Serious	L. R. Sharp	Feb. 15	Engine trouble	At sea	Not stated
Atlantico	Feb. 16	Disabled	At sea	Not stated					
Antietam	Feb. 26	Grounded	Galveston, Tex.	Slight	Minnesota	Feb. 14	Boiler trouble	At sea	Not stated
Aghios Gerasimos	Feb. 17	Sp. ung leak	At sea	Not stated	Mingo	Mar. 2	Sunk	At sea	Total loss
Albert Heog	Feb. 18	Foundered	Off Sweden	Total loss	Moccasin	Mar. 1	Sunk	B. ooklyn, N. Y.	Slight
Astoria	Feb. 28	Sprung leak	At sea	Not stated	Moschausic	Mar. 2	Broke propeller	At sea	Not stated
Argenta	Feb. 16	Sp. ung leak	At sea	Not stated	Mandu	Feb. 21	Grounded	Off Marseilles	Not stated
					Mascotte	Feb. 19	Grounded	Off Key West	Not stated
B. F. Gulnan	Feb. 18	Sunk	Hudson river	Not stated	Metcor	Feb. 27	Broke windlass	At sea	Not stated
Bintang	Feb. 20	Grounded	Off New York	Not stated	Ma garet	Feb. 22	Cargo afire	At sea	Heavy
Bohemian	Mar. 1	Grounded	Halifax	Not stated	Monchy	Feb. 14	Sp ung leak	At sea	Serious
Betsey	Feb. 10	Boiler trouble	At sea	Not stated	Marshal Foch	Feb. 20	Lost sails	At sea	Heavy
Broncho	Feb. 25	Engine trouble	At sea	Slight	Mohawk	Mar. 1	Grounded	B. idgeport, Conn.	Slight
Brave Courier	Feb. 24	Lost propeller	At sea	Not stated	Malden	Feb. 16	Grounded	Long Beach	None
					Moss Point	Feb. 15	Grounded	Tampico	Not stated
					Mohican	Feb. 14	Engine trouble	At sea	Slight
Celtic	Feb. 27	Collision	London	Slight					
Clan Cumming	Feb. 18	Froze pipes	At sea	Slight	Northwestern	Feb. 11	Fire	Port Leches	Serious
Canumet	Feb. 16	Machinery trouble	At sea	Not stated	Natenna	Feb. 28	Leaking	At sea	Not stated
Corsicana	Feb. 24	Tanks leaking	Off Cape Lookout	Not stated	Nancy Hanks	Feb. 26	Lost sails	Off Barbados	Heavy
Cascade	Feb. 15	Grounded	Savannah	Not stated	Neponset	Feb. 22	Sprung leak	At sea	Not stated
Chicomico	Feb. 12	Engine trouble	At sea	Slight	Nobility	Feb. 12	Grounded	Barbados	Total loss
Carrie Long	Feb. 21	Sunk	Off Cedar Keys	Total loss					
Cold Springs	Feb. 12	Struck dock	Live-pool	Slight	Oscar II	Feb. 16	Grounded	Ambrose channel	Not stated
Cedar Springs	Mar. 1	Grounded	Rose island	Not serious	Orion	Feb. 16	Caught in ice	Nova Scotia	Not stated
Cambridge	Feb. 23	Machinery damage	At sea	Not stated					
Colindil	Feb. 18	Machinery trouble	At sea	Not stated	Pesaquid	Feb. 24	Lost rudder	At sea	Slight
Cowboy	Feb. 24	Grounded	Little Cove Point	Slight	Palawan	Feb. 14	Lost sails	At sea	Heavy
Cook	Feb. 19	Broke propeller	At sea	Not stated	Pythou	Feb. 19	Out of coal	At sea	None
Co:son	Feb. 14	Collision	At sea	Not stated	Priscilla L. Ray	Feb. 20	Sunk	Off Florida	Total loss
Canumet	Feb. 14	Machinery trouble	At sea	Not stated	Patience	Feb. 23	Grounded	City Island	Slight
					Pelican	Feb. 12	Holed by ice	Boston	Not stated
Dancey	Feb. 10	Pump trouble	At sea	Slight	Princess Anne	Feb. 16	Grounded	Off Rockaway	Not stated
Delco	Feb. 20	Cargo afire	Off Ireland	Not stated	Polar Bear	Feb. 10	Engine trouble	At sea	Slight
Dixie	Feb. 25	Grounded	Devils Bank Reef	Not stated	Plainfield	Feb. 24	Leaking	At sea	Not stated
Davidson	Mar. 1	Disabled	At sea	Not stated	Pontia	Mar. 2	Grounded	Off England	None
					Pendragon Castle	Feb. 18	Collision	Antwerp	Serious
Esperia	Feb. 24	Engine trouble	At sea	Slight	Prospero	Feb. 11	Caught in ice	St. Johns	Not stated
Echo	Feb. 15	Damaged pumps	At sea	Slight					
Equador	Feb. 12	Lost propeller blade	At sea	Not stated	Quinnpiac	Feb. 18	Collision	At sea	Not stated
Ernest H. Meyer	Mar. 1	B.oke steering gear	At sea	Slight					
					Rostellan	Feb. 20	Lost gear	At sea	Heavy
Fairmount	Feb. 14	Grounded	Savannah	Slight	Red Mountain	Feb. 18	Engine trouble	At sea	Not stated
Farnam	Feb. 14	Engine trouble	At sea	Slight	Rock Island Bridge	Feb. 14	Fire	Portland, Me.	Not stated
Faith	Feb. 27	Pump trouble	At sea	Slight	Rogday	Mar. 1	Holed in bow	San Francisco	Not stated
Fueloil	Feb. 15	Broke propeller	At sea	Slight					
Frank A. Deering	Feb. 14	Damaged rudder	At sea	Slight	Sandbar	Feb. 21	Broke shaft	Off Sea Gate	Slight
Fannie E. Prescott	Feb. 20	Lost rudder	At sea	Not stated	Sunoll	Feb. 14	Engine trouble	At sea	Slight
Francis Parsons	Feb. 11	Foul bottom	At sea	Slight	Sheba	Feb. 20	Grounded	Halifax	Slight
Flore	Feb. 16	Grounded	Bahama	Not stated	Sononia	Feb. 23	Broke shaft	At sea	Not stated
					Sharon	Feb. 18	Grounded	Off Texas	Not heavy
Gwendolen Warren	Feb. 24	Sunk	At sea	Total loss	Sapinero	Feb. 18	Pump trouble	At sea	Slight
Gulf Queen	Mar. 1	Damaged bridge	At sea	Slight					
					Tallac	Feb. 26	Grounded	Cape Henry	Total loss
Hilton	Feb. 29	Short of fuel	Off Mass.	Not stated	The Lambs	Feb. 26	Grounded	Nassau inlet	Not stated
Hilston	Feb. 22	Sunk	Monterideo	Not stated	Tungus	Feb. 22	Grounded	Caybo Arena	Not stated
Herdis	Feb. 22	Leaking	At sea	None	Tlives	Feb. 24	Sprung leak	At sea	Slight
Huyades	Feb. 16	Grounded	San Francisco	Total loss	Tuscan	Feb. 10	Engine trouble	At sea	Not stated
Hillstone	Feb. 17	Sunk	At sea	Not stated					
Huron	Feb. 18	Grounded	Suona	Slight	Vancouver	Feb. 10	Lost rudder	At sea	Not stated
					Victor C. Records	Feb. 22	Sunk	Off Hatteras	Total loss
Interstate II	Feb. 21	Grounded	Oyster island	Slight	Ville d' Alger	Feb. 16	Fire	At sea	Not known
Joan Hickman	Feb. 17	Grounded	St. Johns	Slight	War Expert	Feb. 18	Grounded	Port Arthur	Not stated
Joseph G. Ross	Feb. 28	Holed in bow	Boston	Slight	War Hagar	Feb. 26	Lost propeller	At sea	Not stated
John J. Phillips	Feb. 16	Pumps choked	At sea	Not stated	West Amargosa	Feb. 12	Lost propeller	At sea	Not stated
Jacksonville	Feb. 14	Engine trouble	At sea	Slight	West Aleta	Feb. 16	Grounded	Terschelling	Not stated
John M. Emery	Feb. 18	Grounded	Brazos river	Slight	West Conob	Feb. 15	Lost propeller	At sea	Not stated
Jakyl	Feb. 15	Engine trouble	At sea	Slight	West Islip	Feb. 24	Grounded	Off Virginia	Slight
Juneau	Feb. 10	Collision	Red Hook Flats	Slight	Western Plains	Feb. 17	Engine trouble	At sea	Slight
					West Zulia	Feb. 10	Machinery trouble	At sea	Slight
K. I. Luckenbach	Feb. 12	Grounded	Seven Foot shoal	Slight	Westfield	Feb. 24	Turbines damaged	At sea	Not stated
					Waldemar	Feb. 10	Grounded	Off Scotland	Serious
Lake Canaveral	Feb. 16	Sprung leak	At sea	Not stated	Winsome	Feb. 14	Caught in ice	Off Sandy Hook	Not stated
Lake Copley	Feb. 25	Out of coal	At sea	None	Wakan	Mar. 1	Fire	At sea	Not heavy
Lake Ellilay	Feb. 26	Broke propeller	At sea	Not stated	Watowan	Feb. 15	Engine trouble	At sea	Not stated
Lake Ellsbury	Feb. 16	Boiler trouble	At sea	Slight	W. J. Larman	Mar. 1	Sprung leak	At sea	Slight
Lake Forkville	Feb. 23	Short of coal	At sea	None					
Lake Fontana	Feb. 15	Collision	London	Not stated	Yellowstone	Feb. 16	Broke steering gear	At sea	Not stated
Lake Garza	Feb. 6	Sprung leak	At sea	Slight	Yesoking	Feb. 15	Lost propeller	At sea	Slight
Lake Licking	Feb. 24	Grounded	Matanzas	Slight	Yakok	Feb. 15	Disabled	At sea	Not stated
Lake Lesa	Feb. 23	Grounded	Cape Henry	Slight					
Lake St. Regis	Feb. 16	Grounded	Boston harbor	Slight	Zaca	Feb. 25	Grounded	Elbe lightship	Slight
Leeminster	Feb. 24	Damaged propeller	At sea	Slight					

Base Insures Newark's Growth

Army Supply Terminal Erected at a Cost of Over \$11,000,000
Will Relieve New York Port Congestion—Ready for Private Use

THE Port Newark army supply base is located on the west side of Newark bay, on part of the land occupied by the municipal freight terminal development of the city of Newark, N. J., known as the Port Newark terminal. This terminal is 14 miles by water from lower Manhattan and 10 miles from the ship anchorage of lower New York harbor. It is approached by the Kill van Kull and the Newark bay ship channel, an extension of which is dredged direct to the supply base. The controlling depth of these channels, however, is 20 feet, while the mean low water at the supply base wharf is but 15 feet. The Port Newark army supply base is, therefore, unlike the other terminals constructed by the war department, not directly accessible to ocean going steamers.

When the Port Newark terminal was selected by the council of national defense early in the war as the site for one of the army supply bases, it was proposed to widen and deepen the Newark bay approaches so as to permit the direct loading of vessels drawing up to 28 feet of water. As the war progressed, however, it was found that the berthing facilities projected for the South Brooklyn, N. Y. supply base, as well as the commercial facilities utilized by the army in New York harbor were sufficient for the

immediate military requirements. This was largely due to the fact that the gigantic shipping program originally planned fortunately never materialized, and that up to the time of the armistice it was found practical to divert to other ports, particularly Newport News, Va., much of the freight which otherwise would have been shipped from New York.

The Port Newark terminal was, therefore, used by the army during the war as a shipping point for munitions and bulky merchandise such as motor trucks, rolling kitchens, forage, etc., which was carried by lighters to cargo transports in lower New York harbor. Eight tugs and 161 lighters were permanently assigned to the loading operations of the base. It also served, both during and after the war, as a reservoir for the temporary storage of all classes of heavy military materials.

Was Used Extensively

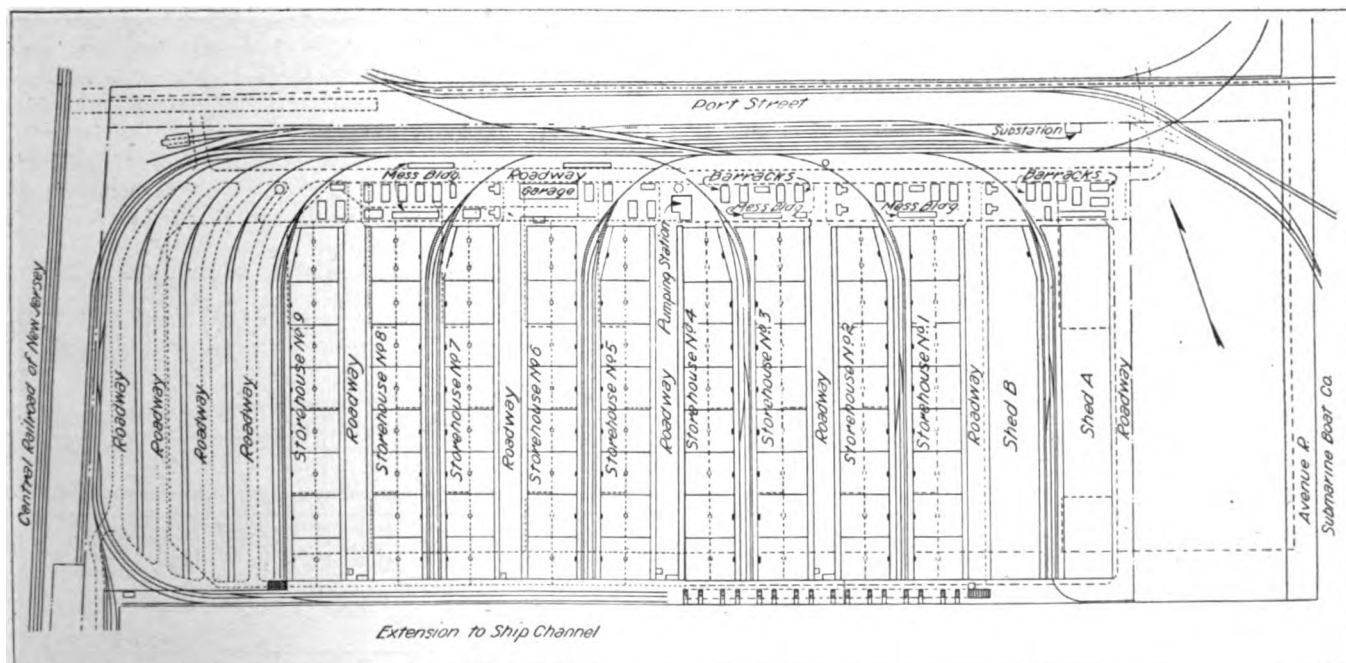
Port Newark was extensively used for the loading of high explosives, thus relieving the hazard of transporting this class of freight through New York or other populous centers. The semi-isolated position of the base made it ideal for handling munitions, which were loaded on barges and lighters and towed to transports far down the bay. Ample space for temporary stor-

age until hold space was available also made Port Newark the logical terminal for the shipment of locomotives and similar heavy cargo to France. In addition to being used for open and closed storage, 419,350 tons of military cargo was handled in and out of this base during the fiscal year 1919.

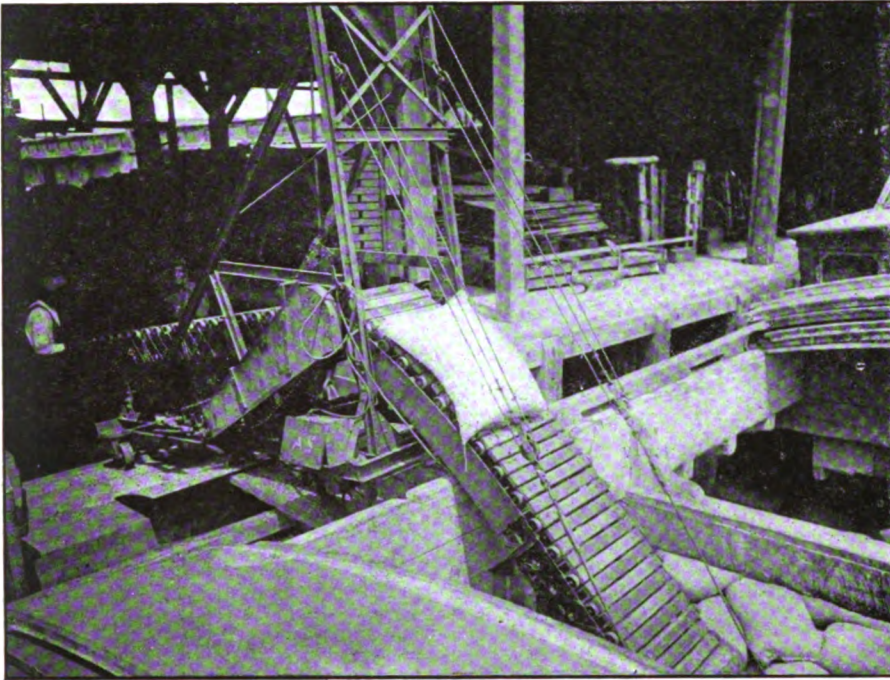
The location of the Port Newark base, as well as its arrangement and equipment, makes it particularly suited for handling lighterage cargo.

The property, being approximately 1600 x 4000 feet, occupies 133 acres of the entire Port Newark terminal property. Of this area, berthing space of 3800 lineal feet is provided with an extension of the Newark bay ship channel. The structures include nine warehouses and two wharf sheds, all placed at right angles to the berthing dock, as well as a number of minor buildings and a partially enclosed bulkhead wharf, all served by nearly 13 miles of inside railroad trackage. From the shore the base is served by two main lines of the Central Railroad of New Jersey, and one main line of the Pennsylvania railroad, over which trackage cars may be shunted to any of the trunk lines entering the New York district.

The warehouses are all of semipermanent hollow tile construction, each 161 x 1121 feet. The gross area of



GENERAL PLAN OF THE NEWARK BAY ARMY BASE TERMINAL—THIS PROPERTY NOW OFFERS A MEANS TO RELIEVE FREIGHT CONGESTION IN NEW YORK



TRANSFERRING FLOUR FROM THE WHARF INTO COVERED LIGHTERS BY MEANS OF MODERN CONVEYING EQUIPMENT

the nine buildings is 1,624,329 square feet. They are all single story, with the exception of warehouse No. 4 which has an upper story with suitable provisions for its use as an administrative office. An 18-foot loading platform with canopy is provided on both sides of each warehouse, to facilitate the movement of freight in and out by either freight car or dray. This shipping platform is on a level with the warehouse floor, the bulkhead platform and the freight car elevation, so that bulky material may be easily moved in all directions with trackless trains.

The two warehouse sheds on the Newark bay end of the property are of light frame, single story construction with open sides and ends, having a gross storage area of 360,962 square feet. They thus serve for the temporary shelter of material moving through the base. The floors of all buildings are concrete, with fire walls

every 140 feet. They are unheated, except warehouse No. 4, which is used for administrative purposes. An automatic sprinkler fire protection system is installed throughout all warehouses.

Trackage System Is Flexible

The warehouses and sheds are served by a trackage system sufficiently flexible for the movement of freight cars to any section of the base with maximum freedom. The total length of trackage on the property being a fraction under 13 miles, includes a car storage capacity of 680 cars. Triple track systems are placed between each alternate building with provision for switching cars from the center track direct to loading platforms on either side. These tracks are connected with a large classification yard directly in the rear of the warehouses, which in turn connects directly with the adjoining lines of the extensive Central and Pennsylvania railroad systems.

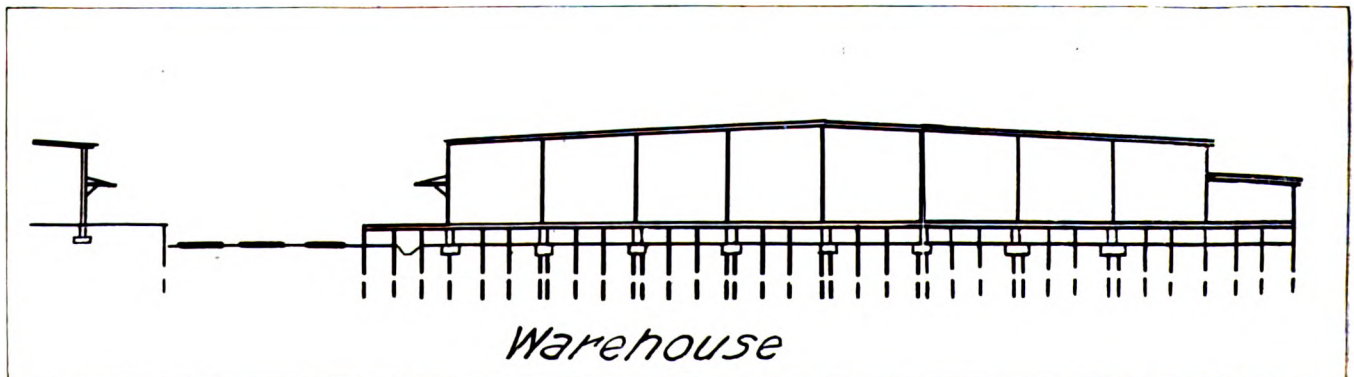
Triple trackage is also provided along approximately half of the berthing bulkhead, the balance of the dock 956 feet, being covered and arranged as a direct loading platform for the use of tractors. The safe load strength of the bulkhead wharf is 800 pounds per square foot.

The material conveying equipment of the base includes 63 tractors, 720 trailers provided with grooves for ships and false bottoms, and 360 hand cars, for handling freight between railroad cars, warehouses and lighters. Two 40-ton and five 15-ton locomotive cranes are also part of the base equipment. Two thousand feet of portable conveyors are included for handling various classes of merchandise on and off lighters. Each warehouse is equipped with modern tiering machines for the vertical arrangement of identical sized packages.

The water supply for the base is furnished from a central pumping station equipped with large capacity electric driven pumps. Three high power gasoline engines are also available for the generation of electric current, making the base, in an emergency, independent of the local distribution.

The capacity originally contemplated for this terminal was between 10,000 and 15,000 tons per day, and the material handling equipment has been designed and arranged on this basis. While the base was never continuously operated to maximum capacity, it is estimated that with the efficient utilization of all its mechanical appliances, considerably over 10,000 tons may be handled daily without difficulty.

The Port Newark base represents an expenditure of \$11,813,000. Since both sides of Newark bay are largely marsh and meadow land, it was necessary to drive thousands of pilings to provide a suitable foundation for the heavy materials stored and loaded at this terminal. The general contractor was the MacArthur Bros. Co.,



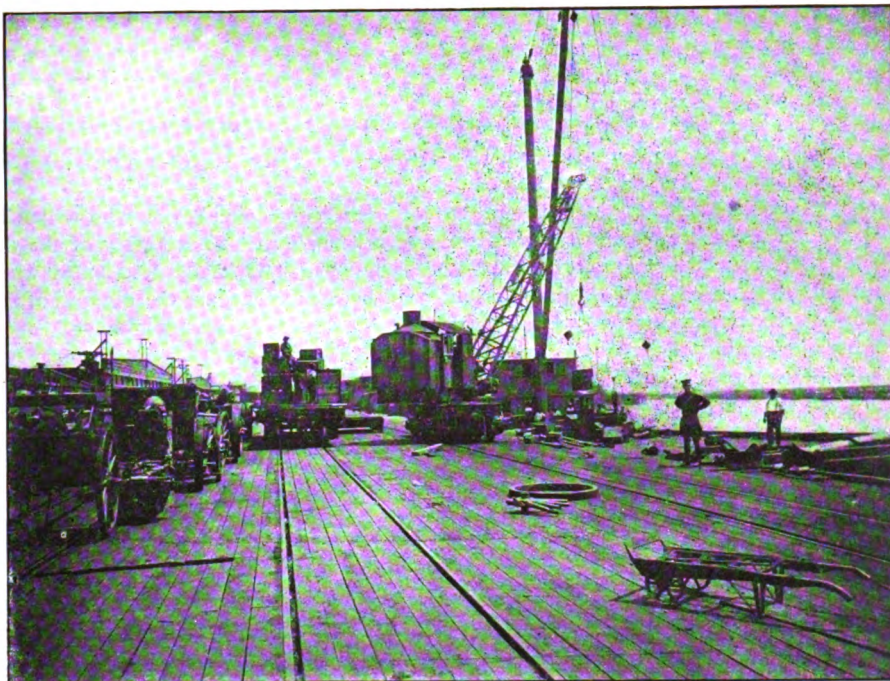
SECTION THROUGH ONE OF THE MAIN WAREHOUSES SHOWING TYPE OF CONSTRUCTION

who performed the work under the supervision of the construction division of the army. Preliminary construction was started in October, 1917, and the completed project turned over to the army transportation service for operation in March, 1919, although sections had been utilized as completed from the summer of 1918.

This terminal as it stands is a material addition to the greatly congested shipping facilities of the port of New York, even though its present use is restricted to lighterage shipping. With the ever increasing marine traffic of New York harbor, however, the day is not far distant when Port Newark will have to be made accessible for berthing ocean going freighters. Five thousand ton vessels with a draft of 26 feet are now being handled at Bergen point, the junction of Kill van Kull and Newark bay, five miles below Port Newark.

The work of increasing the width of Newark bay channel between Kill van Kull and the upper limits of the bay, from 300 to 400 feet, is in fact already projected and a government appropriation set aside for the purpose. The execution of this work, however, is contingent upon the reconstruction by the Central Railroad of New Jersey of its present Newark bay bridge between Bayonne and Elizabethport, to increase the present navigational openings from 85 to 100 feet. Since the present commerce of Newark bay is practically confined to barges and similar craft operating in and out the Passaic and Hackensack rivers, this will probably make the existing facilities sufficient to meet immediate requirements. As soon as the demand for additional ship berthing space in New York harbor becomes sufficiently acute, however, the expenditure of \$3,451,600, the estimated cost of a 31-foot channel to the Port Newark terminal, will at once become an economic necessity.

With such a channel, it would be possible simultaneously to berth 11 av-



CRANES USED IN TRANSFERRING FREIGHT FROM FLAT CARS INTO LIGHTERS—SEVERAL OF THESE ARE PROVIDED

eraged size freighters along the bulkhead wharf of the supply base alone, in addition to the other docking facilities of the Port Newark terminal. Assuming for each vessel an average stay of 12 days, with a maximum of 25 vessels accommodated during the year at each berth, it would be possible to handle 275 vessels annually at the army base. While the plant, of course, has never been put to such an actual test, it is estimated that this number of ships could be handled in or out annually with an efficient utilization of the mechanical material conveying equipment installed.

Used for Storage Purposes

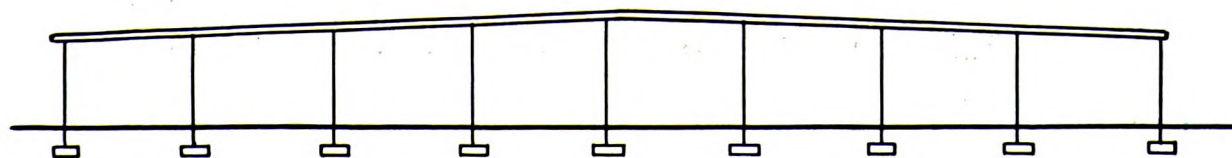
Since the armistice, the Port Newark base has been used almost exclusively for the storage of ordnance and other heavy materials returned from France, as well as for property removed from dismantled army trans-ports. In this way the army has been able to clear its more urgently needed

terminals and thus permit of their utilization by commercial shipping. These stores now at Port Newark will in the near future be moved inland, or otherwise disposed of, and the entire base made available for the needs of the merchant marine.

Discuss Ship Securities

The first meeting of the bankers' committee on ship securities, appointed by Chairman John Barton Payne of the United States shipping board was held March 3, at New York.

Henry M. Robinson, chairman of the committee, presided. The meeting resulted in a definite understanding as to the scope of the work to be done by the members, the method of procedure and the extent to which the board can co-operate with the committee. John E. Barber of Harris Forbes & Co., bankers, New York, was appointed secretary of the committee which will have its headquarters at 45 Broadway.



Open Shed

New Head of Shipping Board

Admiral W. S. Benson is Chosen by President Wilson to Succeed John Barton Payne—He Has Had a Brilliant Career in the Navy

NOMINATION by President Wilson of Admiral William Shepherd Benson, U. S. N., retired, to succeed Judge John Barton Payne as chairman of the United States shipping board, has aroused considerable speculation quite naturally as to the policy the admiral may pursue with regard to the American merchant marine.

Surmises that simply because he has been attached to the government service for a great many years as a member of its naval establishment, he would be opposed to private ownership and operation of the fleet are, to say the least, a case of jumping at conclusions. But, contrary to these reports, there is reason to believe that Admiral Benson holds an entirely opposite view and is, therefore, in favor of a privately owned and operated merchant marine. The admiral himself, in the absence of having his name confirmed by the senate, although it is expected to confirm his nomination, refuses to express views as to what his policy will be. However, the statement that he is expected to favor a privately owned and operated fleet is based on the fact that he has gone over the work of Judge Payne and analyzed the latter's policy. He is said to have fully approved

the policy of Judge Payne, who will take up his new duties as secretary of the interior when it is finally determined what will be done regarding the disposal of the former German passenger ships. Judge Payne, as is known, is in favor of a privately owned and operated merchant fleet, and while criticism has been made as to the process he would adopt to bring that about, there is conclusive proof that he is against government ownership and operation.

In conflict with some published reports also, is the fact that Admiral Benson is understood to be strongly in favor of having naval transports not immediately needed by the navy placed in and under complete control of the merchant fleet, to be used by the navy in cases of emergencies only.

It may be a question as to what qualifications Admiral Benson acquired through his naval service to serve as chairman of the shipping board, but certain it is that he is a strong character, perfectly capable of forming conclusions and executing them. His record in the naval service is a brilliant one, showing him to have worked up from the lowly rank of cadet midshipman to the highest honor that can be assigned a naval officer, that of the permanent rank of full admiral. This honor was conferred upon him in accordance with a message which the President sent to congress on July 18, 1919, meeting with the full approval of Secretary of the Navy Josephus Daniels, who had recommended that such action be taken. It was meant to be in recognition of the services of Admiral Benson, a brief sketch of which is given here. Long before the world war began, congress created a new position of



ADMIRAL WILLIAM SHEPHERD BENSON, U. S. N., RETIRED

Appointed by the President to succeed John Barton Payne as head of the Shipping Board, Admiral Benson established a record of unusual brilliancy in the navy, being in control of American naval operations during the war

leadership in the navy department known as chief of naval operations. To that place of responsibility, the President called William S. Benson, then a captain in the navy, in whom confidence was placed because of the qualities he was held to have as a statesman, as well as knowledge of his profession, affording ability to visualize naval needs and to carry out well matured naval policies. A strong advocate for naval preparedness, he has been credited generally for responsibility in having the navy in condition when war was declared. Shortly after the United States entered the conflict, Admiral Benson was selected to go abroad to confer with associate nations and he laid before the admiralities the views of this country, and co-operated with them in the joint naval policies which were adopted. When the American peace commission

assembled in Paris, Admiral Benson was chosen as the naval advisor of the mission, serving in that quasi-diplomatic post with credit to the country and himself. Allied nations conferred their highest honors upon him.

Admiral Benson was born in Bibb county, Georgia, Sept. 25, 1855, and was appointed a cadet midshipman to the naval academy from the fourth district of Georgia, Sept. 23, 1872. He completed the course June 20, 1877. On June 18, 1879, he was promoted to the rank of midshipman and served on the U.S.S. CONSTITUTION for two years. He was appointed an ensign July 27, 1881, after which his promotions came in the following order: Lieutenant (Jr.), 1888; lieutenant commander, 1900; commander, 1905; captain, 1909; rear admiral, 1915; admiral (chief of naval operations), 1916. He has served as an officer on

numerous ships, having been commanding officer of several of the first class dreadnaughts, and at one time chief of staff of the Pacific fleet. He served as commandant of midshipmen at the naval academy from 1907 to 1908 and was commandant of the Philadelphia navy yard and supervisor of the third, fourth and fifth naval districts from August, 1913, until April, 1915, on which date he was assigned to duty as chief of naval operations, and was commissioned with the rank of rear admiral from March 11, 1916. This rank was later changed to that of admiral on Aug. 29, 1916. In the latter part of 1917, he was assigned to temporary duty abroad in London, after which he returned to the United States and Oct. 15, 1918, he was ordered to special duty at Paris. He remained abroad until June 11, 1919.

Condensed Reviews of Latest Books

Applied Science for Metal Workers, by W. H. Dooley; cloth; 479 pages, 5 x 7¼ inches; published by the Roland Press Co. and furnished by THE MARINE REVIEW for \$2.

The author, who is in charge of the navy yard instruction school for the New York board of education, has prepared this volume for use in technical, industrial, apprentice and continuation schools and for science classes in secondary schools. The work is in the form of a text book with numerous questions at the end of each chapter. The subjects treated apply to physics, chemistry, etc., and are arranged to teach the fundamental principles of science in such a way that the student or apprentice will understand in an intelligent manner the actual work as prosecuted in the shop under working conditions. Numerous illustrations are included to make the subject matter as clear as possible.

The chief purpose of the book is to teach the student the principles of industrial science in a practical rather than in an abstract way. Thus, after he has completed his education, the student will be able to grasp the principles of science in actual operation as he views them in everyday life. The book is written in clear, convincing language wherein theory is discarded as much as possible. As a text book for the student, it will prove of material aid.

Marc St. Hilaire Method for Finding a Ship's Position at Sea, by Capt. F. E. Uttmark; cloth; 36 pages, 8 x 10¼ inches; published by the author and furnished by THE MARINE REVIEW for \$2.50.

The method in question was introduced by Admiral Marc St. Hilaire the French navy about 30 years ago and it is generally known as a reliable and convenient means for finding a ship's position at sea.

The author aims to present to the student simple working rules that may be readily comprehended by the average person. A number of examples have been worked out and included in the book. These cover all practical combinations and show positions on plotting charts of the author's design.

According to the United States Naval institute, the method in question is one of the most practicable for finding a ship's position by employing the intersection of the Sumner lines, and is used extensively in the United States navy.

The book will prove of value to the student and at the same time it will be a welcome addition to the library of any ship's officer.

Notes on the Stowage of Ships, by Charles H. Hillcoat; cloth; 237 pages, 5½ x 8½ inches, published by the Colonial Publishing Co. and furnished by THE MARINE REVIEW for \$3.

This book is a collection of notes compiled in the form of a manual for those seeking information on the subject of stowing cargoes in mer-

chant vessels. The book is now in its third edition and has been carefully revised to bring it up to date. Extracts from the board of trade regulations have been added to give necessary information concerning the regulations for the carriage of cattle, grain, explosives and other merchandise of a dangerous character.

The book is arranged in alphabetical order for ready reference. The numerous articles of which a ship's cargo are composed under all sorts of trade are described and the amount of space required for stowing the unit in which they are packed, is given. On such subjects as coal and cotton, for example, the descriptive matter is elaborated to cover the subjects fully.

Full instructions for stowing cargoes are included, together with a specific gravity table of several hundred substances. Two inserts showing stowage, longitudinal sections of typical vessels are included. These are in two colors, and, in stowing cargo designated for different ports, it shows just where articles that are to be unloaded first should be stowed.

The task of gathering the data for the first edition of the book which appeared some years ago covered a period of over 20 years. This material has been added to in subsequent editions. The book should prove of value to ships' officers and others interested in the business of transportation by water. The author is a master mariner.

Marine News in a Personal Way

Intimate Gossip About What Leaders in the Maritime World Are Doing

ROBERT W. BAXTER, after serving eight years as vice president of the Alaska Steamship Co., Copper River & Northwestern railway and affiliated companies, has tendered his resignation to take effect at the approaching annual elections. After a vacation in California, Mr. Baxter intends to return to railroading, in which he has been actively engaged for many years. He began his career as messenger boy with the Union Pacific in Wyoming and remained with that company for many years, advancing to general superintendent. He was later connected with the Baltimore & Ohio railroad in the same capacity and later was general superintendent of transportation of the Lehigh Valley railroad. He resigned as general superintendent of the Illinois Central to take the positions which he is now vacating. Mr. Baxter has been closely identified with Alaskan affairs and during his regime, Alaska Steamship and allied corporations have recorded great development.

* * *

A. F. HAINES, vice president and general manager of the Pacific Steamship Co., has returned from an extended tour of the east. Mr. Haines was an important witness at Washington before the senate committee on commerce, where he gave his views on the policy the government should adopt toward the merchant marine.

* * *

R. D. PINNEO, manager of the foreign department of the Pacific Steamship Co., is making an extended tour of eastern centers in the interests of his company. Mr. Pinneo is calling on the company's various agencies and is paying particular attention to the development of Oriental commerce through Puget sound.

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EARL F. TOWNSEND, assistant to R. D. PINNEO, manager of the foreign department of the Pacific Steamship Co., has been appointed agent at Singapore for his company. Mr. Townsend began his steamship career as office boy at the Seattle offices. During the war he was connected with the shipping board as assistant manager of the supercargo department. The Singapore agency is a new venture and is the result of the

establishment of direct service between the Straits Settlements and Seattle.

* * *

JAMES B. LEARY has resigned his position as traffic manager of J. S. Emery & Co., Boston, to take his old position as New England agent of the Delaware & Lackawanna railroad. He is succeeded as traffic manager of the shipping interest by JOHN B. LEONARD, recently assistant traffic manager of J. S. Emery & Co., and previous to that for 10 years connected with the foreign freight department of the Boston & Albany railroad.

* * *

F. B. OLIVER, formerly chief inspector of the construction and repair department of the Boston district of the shipping board has resigned his position to become port engineer for J. S. Emery & Co., Boston. ALEXANDER MCGREGOR, assistant chief inspector for the shipping board at Philadelphia, succeeds Mr. Oliver as chief inspector at Boston.

* * *

W. B. POLLOCK recently was appointed manager of the marine department of the New York Central railroad with headquarters at the road's operating department, New York.

* * *

FRANCIS E. MCGOVERN has been appointed general counsel of the United States shipping board where he has charge of the settlement of construction claims as chairman of the construction claims board. His headquarters are at Washington. Mr. McGovern is one of the law firm of McGovern, Harmen, Reiss & Devos, Milwaukee. He has been actively engaged in the practice of law in Milwaukee for a number of years. When the war began, he was commissioned first as major and later as lieutenant colonel in the judge advocate general's department.

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CLIFFORD D. MALLORY, of C. D. Mallory & Co., has been appointed a member of the board of governors of the United States Steamship Operators' association.

* * *

MAURICE C. WILSON has been elected vice president of the American Navi-

gator Log Corp. Mr. Wilson, who formerly was export manager for Cosgrove & Wynkoop, Ltd., coal exporters, New York, has been in the steamship business at the port of New York for many years. During the war he was an officer in the United States navy and for a short time was connected with the United States shipping board as assistant to the vice president.

* * *

ERNEST M. BULL was elected president of the Bull Steamship Co., New York, at a recent meeting of the company's directors. Other elected officers are: A. L. BURBANK, vice president and treasurer; J. L. PARKINSON, secretary, and A. H. BULL, chairman of the board of directors. A. H. Bull was president of the company for a number of years. The by-laws of the company were altered recently to permit his election as chairman of the board.

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JOSEPH KELLEHER, formerly freight traffic manager of the United Fruit Co., with headquarters at New York, has become president of the Beninato Fruit & Steamship Co., New Orleans.

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COL. CHARLES L. POTTER has been named president of the Mississippi river commission by President Wilson, who also named LIEUT. COL. HERBERT DEAKYNE and HARRY BURGESS as members of the commission.

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JOHN JOSEPH COUGHLAN is now the managing partner of the firm of J. Coughlan & Sons, Vancouver, structural steel manufacturers and shipbuilders. The company's plans for a drydock at Vancouver recently were accepted by the Canadian government.

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WILLIAM G. COXE now has charge of the Pusey & Jones plant, Wilmington, Del. Formerly he had charge of the company's Gloucester yard.

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WILLIAM A. SILVER, who formerly was connected with the United States Transport Co., has accepted a position with the United States shipping board as traffic manager of the division of operations, with headquarters at Philadelphia.

Marine News in a Personal Way

Intimate Gossip About What Leaders in the
Maritime World Are Doing

SIR ALFRED BOOTH, head of the Cunard line, recently arrived in New York from Liverpool to look after his shipping interests in this country. It also is his intention to inspect the plans for the line's new 24-story building at Battery park, New York. He will also look after the purchase of additional piers for the accommodation of the line's fleet.

* * *

J. C. MCKENZIE has accepted a position as marine engineer with the Power Specialty Co., New York. He will have charge of the company's service department for marine superheaters and boilers. Formerly Mr. McKenzie was with the Emergency Fleet corporation in the performance branch where he had charge of trial trip data.

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HENRY W. WENDT recently was elected president of the Buffalo Forge Co., Buffalo. Other elected officers are: EDGAR W. WENDT, vice president and treasurer; HENRY W. WENDT JR., vice president and secretary, and C. A. BOOTH, vice president and sales manager. The board of directors includes the above named officers and H. S. WHITING.

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W. S. RUGG and CHARLES ROBBINS recently were appointed assistants to the vice president of the Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa.

* * *

SIDNEY H. McLANE recently was appointed general manager of the Mobile Shipbuilding Co., Mobile, Ala. He has been general superintendent for several months, being previously associated with the Fred T. Ley Co. Mr. McLane has had 30 years' experience as a shipbuilder.

* * *

W. S. NEWELL, associated with the Bath Iron Works, shipbuilder, Bath, Me., has been elected consulting engineer for the Watson-Frye Co., Ltd., foundry, Bath, Me. His association with the Bath Iron Works will be unaltered by this new appointment.

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LIEUT. COMMANDER THOMAS B. RICHIEE of the construction department of the Charlestown navy yard, Charles-

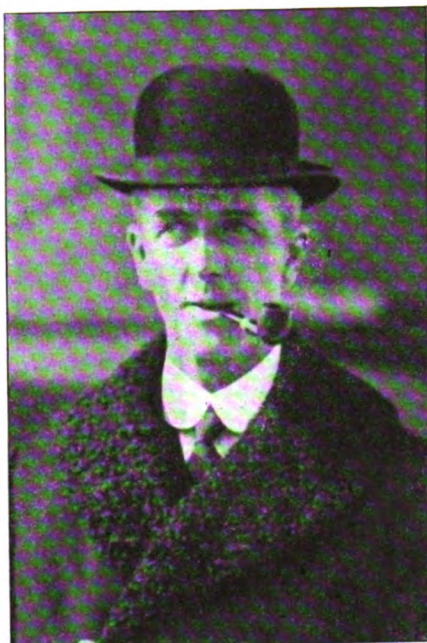
town, Mass., has been promoted to the rank of temporary commander.

* * *

CHESTER M. SHUBERT, welfare manager of the Texas Steamship Co., Bath, Me., has accepted a position in the New York office of the Texas Co. He will be succeeded at Bath by WILLIAM M. ADAMS, for many years employed in the office of the Bath Iron works.

* * *

DAVID W. SIMPSON, Boston, was elected president and treasurer of the



SIR ALFRED BOOTH

Boston & Gloucester Steamship Co. at a recent meeting of the directors.

* * *

LIEUT. COMMANDER W. J. MARSHALL of the United States navy recently was appointed chief engineer of the Pennsylvania nautical schoolship ANNAPOLIS. Commander Marshall has had 16 years' experience in training officers and men for the naval reserve. During the war, he had charge of all repairs on ships of the overseas transportation service numbering about 200. He also had charge of fitting out these vessels.

* * *

J. F. JENSEN has been appointed manager of the Philadelphia and Baltimore stores of the Ocean Ship Chandlery Co.,

Ltd., to succeed CAPT. JOHN F. CHARLTON, who recently resigned. For many years Mr. Jensen was associated with the Henry A. Kessel Co., Philadelphia, and for the last three years he was manager of that company's Baltimore branch.

* * *

MAJ. A. RICHARDSON, who until recently was one of the firm of Stone-Richardson, Inc., steamship agent and broker, New York, has been made general manager of the Black Diamond Steamship Corp., with headquarters at 67 Exchange place, New York.

* * *

M. V. RODNEY recently was elected president of the Tropical Steamship Corp., New York, to succeed W. E. MULLINS, who resigned.

* * *

ARTHUR SEWALL II recently was elected secretary and member of the board of directors of Patterson, Graham & Co. Mr. Sewall has been associated with the corporation since its organization some years ago. The corporation handles vessels for Williams Dimon & Co., San Francisco, and the Columbia Shipping Co. It also operates a number of shipping board vessels.

* * *

W. A. WINBURN, Savannah, Ga., has been elected president of the Ocean Steamship Co. E. R. RICHARDSON, New York, has been elected vice president and general manager of the company. CHARLES H. MARKHAM, Chicago, was elected chairman of the board.

* * *

JOHN A. TAIT, of Furness, Withy & Co., recently was elected president of the Traffic club of Philadelphia. He succeeds W. H. REED. The retiring president was presented with a gold watch and chain by the organization.

* * *

C. G. TOMLINSON recently was appointed manager of the Jamaica branch of the Inter-Colonial Steamship & Trading Co. Formerly Mr. Tomlinson was connected with the United Fruit Co.'s Jamaica branch.

* * *

JOHN M. FOX has been appointed supervisor of equipment for the Black & Decker Mfg. Co., Baltimore.

Bits From the Log of Progress

Events of Interest to Those Engaged in Operating,
Constructing and Outfitting Yards and Ships

THE Standard Oil Co., New York, recently placed a contract with the New York Shipbuilding Co., Camden, N. J., for three 12,500-ton deadweight steel tankers. Keels for the ships have been laid. No announcement has been made as to the price of the vessels or the date of delivery. With the award of this contract, the New York Shipbuilding Co.'s Camden plant will build at least six oil carriers during the present year. The yard is now engaged in constructing a 12,000-ton tanker for W. R. Grace & Co., and two 10,000-ton tankers on its own account.

* * *

THE WILLIAM Cramp & Sons Ship & Engine Building Co., Philadelphia, recently launched the torpedo boat destroyer McCORMICK. This vessel is the seventeenth destroyer out of a contract for 25 awarded to the Cramp yards by the navy department. Eight of the vessels are now in commission and work on the remainder of the vessels is well under way.

* * *

A 33,000 gross ton passenger liner will be built by the International Mercantile Marine Co. for its Red Star line. The contract has been awarded to Harland & Wolff, Belfast, Ireland. The vessel, it is said, will be laid down within the next six months, earlier work being precluded as yards abroad are swamped with work. She will have a speed of 19 knots an hour and will be equipped for burning oil. This is the first vessel with a register greater than 20,000 tons that any company has contracted for since the signing of the armistice.

* * *

INSTALLATION OF boilers, engines and other machinery in the five large wooden vessels purchased from the United States shipping board by the National Oil Co., New York, has begun at the Meacham & Babcock plant, Seattle. Three hundred men are employed on the job which is expected to take 70 days to complete. These vessels formed a part of the large fleet of wooden steamers laid up in Lake Union, Seattle.

* * *

THE UNION Oil Co. has placed an order for four modern steel oil carriers with a total deadweight capacity of 46,-

000 tons with the Sun Shipbuilding Co., and the Merchant Shipbuilding Co., both of Chester, Pa. Each yard is building two of the vessels. The vessels are of 12,500 tons and will be equipped to carry approximately 3500 tons of package cargo on return voyage.

* * *

THE BALTIMORE Dry Docks & Shipbuilding Co., Baltimore, Md., has bought the shipbuilding plant of the Pusey & Jones Co., Gloucester, N. J. Holden A. Evans, president of the Baltimore company, stated that possession of the newly acquired yard would be taken in the near future. The sale price was not given out.

* * *

THE SUBMARINE Boat Corp., Newark, N. J., is to build 20 cargo carriers of the same type as those furnished on government orders. No announcement has been made as to the ultimate owners of the vessels but it is understood that they are for foreign interests.

* * *

SHIPYARD FACILITIES at Savannah, Ga., have been increased by the completion of a marine railway which the National Shipbuilding & Drydock Co. recently built at Hutchinson island. Docking facilities are now available for vessels up to 3000 tons, deadweight. The railway was designed by the Crandall Engineering Co., East Boston, Mass.

* * *

THE TODD Drydock & Construction Co., Tacoma, Wash., recently laid the keel for the first of two 7500-ton steel vessels to be constructed for its own account. At the present time, the company is building five 7500-ton vessels for the government besides three scout cruisers for the navy.

* * *

NORFOLK, VA., is to have another shipyard in the near future. It is announced that the Norfolk Shipyards Corp., capitalized at \$500,000, will be established at that port. The officers of the corporation are: President, Benjamin Lowenberg; vice president, S. Lloyd Drake; treasurer, David L. Lowenberg. The site for the new plant comprises 50 acres.

* * *

AN AGREEMENT with the American International Shipbuilding Co. was reached

recently by which the United States shipping board took over the title of the Hog island yard at Philadelphia. Approximately \$4,000,000 is involved, it is stated. The board exercised an option to purchase the land for \$1,700,000 and in addition allowed the shipbuilding company \$2,000,000 for the cancellation of 58 contracts. Also \$79,000 each was given for the completion of the 12 vessels now being constructed for the army and navy. Under the agreement, the International company is to continue to operate the yard until the 12 vessels are completed.

* * *

REPRESENTATIVES OF David Rodgers, Seattle, recently filed plans for a drydock at Vancouver, B. C., which, if accepted, will be followed by the investment of \$15,000,000 of British capital in Burrard inlet, Vancouver. The plans call for a graving dock, 1150 feet long. Negotiations for the construction of the dock began several months ago.

* * *

THE VICTORY plant of the Bethlehem Shipbuilding Corp., Squantum, Mass., was closed recently when the torpedo boat destroyers CONVERSE and OSBORNE, under construction at the yard, were towed to the Fore River yard at Quincy, Mass. Five hundred of the workmen employed at the Squantum plant were transferred to the Fore River yard, the remainder of the men being laid off. The Victory plant was built in 1917 at a cost of approximately \$9,000,000. It will be taken over by the navy department and used as an adjunct to the Charlestown navy yard for the repair of submarines and destroyers.

* * *

DIESEL INTERNAL combustion engines have been placed in the tanker BRAMELL POINT at the South plant of the Baltimore Dry Docks & Ship Building Co., Baltimore. The vessel has had a satisfactory trial trip. She is said to be the first tanker to be powered with diesel engines.

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THE GLOBE Shipbuilding & Drydock Co., Baltimore, is to install a 9000-ton floating drydock of the latest design. This dock is to be of the longitudinally trussed sectional type, designed and developed by the Crandall Engineering Co., East Boston, Mass.

Bits From the Log of Progress

Events of Interest to Those Engaged in Operating,
Constructing and Outfitting Yards and Ships

ASPECTACULAR and costly marine accident occurred at the Panama canal recently. An explosion took place in one of the holds of the American steamer *MARNE* while she was reloading part of her cargo at pier 11, Cristobal. Fire immediately broke out. On her way to the canal, the *MARNE* experienced considerable trouble with her telegraph. Upon arriving at the canal, her commander made application to discharge part of her cargo at one of the terminal piers in order that the trouble might be located and remedied. She carried 8000 tons of general cargo including 160,000 cases of gasoline and benzine. The fire resulting from this highly inflammable material was beyond the control of the terminal fire fighting facilities so the vessel was towed away from the dock and sunk in shallow water. Due to the intense heat, it was impossible to open the sea cocks so the vessel was sunk by gun fire from navy submarines. Fifty-four shots were fired from 3-inch guns. After the vessel sank, the oil on top of the water continued to burn while cases of flaming benzine and gasoline floated away from the ship, spreading out over the harbor for a distance of half a mile. The *MARNE* is a product of the Federal Shipbuilding Co., Kearny, N. J. She was in service between New York and Australia.

GOVERNOR SMITH, of New York, recently stated at the New York barge canal conference that between \$23,000,000 and \$24,000,000 would be needed to complete the waterway and he recommended that the question of a bond issue be submitted to a referendum vote next fall. More than \$13,000,000 would be needed for repairs, improvements and the construction of grain elevators and terminals, he stated, while the remainder would be necessary to settle the various claims for land.

THE SECRETARY of the navy has established a wave length of 800 meters for all radio compass work in connection with the United States naval shore radio compass stations. In order to allow merchant vessels ample time to have their radio apparatus tuned to 800 meters, compass stations will furnish bearings on either 600 or 800 meters

until April 1. After this date radio compass stations will be confined exclusively to 800 meters. The change in wave length was made to eliminate some of the congestion on 600 meters which has been the wave length used for all radio communication with merchant vessels.

ADVOCATES of small tonnage freight steamships are pointing to the average tonnage per vessel of the ships now under construction in British and American shipyards as a strong argument in favor of the retention of the small freighter in the American merchant fleet. Compilations prepared recently show that the average of all tonnage being built by Great Britain at the end of 1919 was somewhat over 3700 tons per vessel while the average for American vessels was 4450. Those in favor of the small ship state England has use for the comparatively small freighter and that America should not eliminate such craft from her future merchant fleet.

THE SHIPPING board steamer *WILLIAM HENRY WEBB*, which was afire at sea off Tucker's beach, N. J., was towed into New York harbor by the steamer *PANAMA* after three tugs which answered the distress signals put out by the *PANAMA* had brought the *WEBB* as far as Sandy Hook. Captain Oakley, master of the *PANAMA*, reported that the fire had been extinguished on the *WEBB* before his ship came alongside. None of her crew was forced to leave the *WEBB*. The fire is reported to have started in the boiler room of the vessel, which is an oil burner. She was on her maiden trip from Philadelphia to New York.

THE SHIPPING board has decided that the removal of the construction division of the Emergency Fleet corporation from Philadelphia to Washington is not practicable and an order signed by John Barton Payne recently was sent out postponing the move indefinitely. It was the board's original intention to install the entire division, with its 1700 employees, in Washington by April 1. Obstacles in the way of housing conditions in Washington and the difficulties likely to be encountered in attempting

to handle actual shipbuilding activities from the capital, caused the board members to reconsider their original intention.

AWARDS TOTALING \$1,732,388 for nine vessels requisitioned while under construction in American shipyards during the war were recommended recently by a committee of the shipping board. Of this sum, \$1,063,000 would go to the Barber Steamship Co. for two vessels; \$177,230 to the Brooks-Scanlon Co. for one ship; \$383,000 to the Luckenbach Steamship Co. for four vessels, and \$109,068 to the Ocean Steamship Co. for two vessels. The valuation of the claims it was stated, was reached on the basis of the worth of materials on Aug. 3, 1917, when they were requisitioned, plus 10 per cent for increased value and an arbitrary allowance for indirect expenses. One of the Barber company's claims was for the steamer *ONEGA*, which was under charter to the French government when sunk by an enemy submarine.

THE LARGEST voucher carrying but one signature to pass between departments of the federal government was one drawn recently for \$155,000,000. This voucher was a remittance from the United States Shipping Board Emergency Fleet Corp. covering the proceeds of its operation of its own and requisitioned vessels. The revenue credited to the board's own ships totalled \$112,000,000.

ELEVEN MEMBERSHIPS to the Maritime Association of New York recently were sold at auction at prices ranging from \$300 to \$390 each. The certificates had been forfeited by members who had defaulted in the payment of their dues. The maximum membership of the association is 1200, and as there are about 50 applications for membership on file no one can become a member except by buying the membership of another.

WHILE STEVEDORES were unloading her cargo of alfalfa seed and linseed oil in Brooklyn, N. Y., recently the steamer *MOCCASIN* of the Munson line sank in a mysterious manner at her dock. Only 1200 bags of seed remained to be taken off when the liner sank. The *MOCCASIN* formerly was the German ship *PRINZ JOACHIM*. It is stated that the vessel can be raised without difficulty.

Activities in the Marine Field

Latest News From Ships and Shipyards

Lake Operators Look for Busy Season

BY CAPTAIN MARTINGALE

ACCORDING to present indications, the Great Lakes navigation season of 1920 will open late, due to the fact that ice in the upper lakes is unusually heavy. Sales of ore have been heavy and practically the entire output for 1920 has been taken. The ore movement is expected to reach 60,000,000 tons against 47,000,000 tons in 1919. While no delay is expected in moving ore down the lakes, lack of cars at lower lake terminals may hinder the movement from the docks to the furnaces and delay vessel dispatch. The bulk freighter fleet is smaller by three vessels than it was at the opening of navigation in 1919 but this factor is not expected to prove a serious detriment. Four bulk freighters are being built. The first one is scheduled for launching in April. Unloading of the winter storage grain has been going on briskly but this work has been handicapped to a certain extent by lack of cars. Coal demand is certain to be heavy. Water levels of the lakes are slightly lower than a year ago.

The steamer C. F. BIELMAN, which was lying in the Black river at the Detroit Edison Co.'s plant, Port Huron, Mich., caught fire recently causing damage amounting to \$10,000. Due to the fact that men were working around the vessel's machinery before the fire was discovered, it is thought that the fire was caused by a torch accidentally left behind when the men knocked off work for the day. The fire was discovered at 10 p. m.

Grain unloading at Buffalo is being expedited with all haste in an effort to get all storage winter grain at that port unloaded by the end of March. Due to the fact that there are comparatively few vessels holding grain at Buffalo, it will not take long to get them unloaded. However, due to the scarcity of cars, the work will be retarded so that the last vessel will not be unloaded until April 1, the date set in the contracts.

In a decision recently handed down in the COWLE-BYERS case by Federal Judge D. C. Westenhaber, damages approximating \$60,000 were assessed against the steamer A. M. BYERS. The suit was the result of a collision between the two vessels which occurred near Wilson island, St. Clair river, on the morning of May 13, 1919, at 5 o'clock. The steamer JOHN B. COWLE, owned by the Great Lakes Steamship Co., was downbound while the A. M. BYERS of the North American Steamship line

was upbound. The BYERS was running close to the Canadian bank when she suddenly sheered out into the channel, hitting the COWLE. Owners of the COWLE put in a claim for \$66,000 damages while the BYERS interests entered a counter claim for \$44,000 damages. Judge Westenhaber decided that the fault rested solely with the BYERS in running too close to the bank and he ordered damages assessed against that vessel. The exact amount of damages to be paid will be determined after the taking of damage evidence by a commissioner.

After a hearing lasting for three days, the suit of the Pittsburgh Steamship Co. to recover \$120,000 damages from the steamer AMERICA of the Lake Transportation Co. for sinking the steamer W. R. LINN in a collision in Lake Huron, Nov. 3, 1918, was brought to a termination in the United States court at Detroit recently. Judge Tuttle awarded the Pittsburgh Steamship Co. damages amounting to \$110,000.

The sidewheel steamer HURON, which is wintering in Cleveland, is to be sold, according to an announcement of the Chicago Steamboat exchange. The vessel was built in Cleveland in 1885 and for many years was engaged in the passenger and package freight business. Sometime ago she was put into the business of carrying automobiles for which trade she has a capacity of 100 cars.

Thomas Elliott, chief engineer of the car ferry MARQUETTE & BESSEMER No. 2, died at Conneaut, O., recently. He was 44 years old and had been employed on Great Lakes vessels for many years.

The directors of the American Shipbuilding Co. and the Great Lakes Towing Co. held meetings recently in Cleveland. After transacting some routine business the shipbuilders adjourned. The directors of the Towing company met with the object of electing officers but found a quorum lacking for this purpose.

Four passenger vessels, property of the Cleveland & Buffalo Transit Co. are undergoing a thorough overhauling to make them ready for what the company anticipates will be one of the busiest seasons in its history. The CITY OF BUFFALO is docked at the American Shipbuilding Co.'s plant, Cleveland, where she is being refitted from stem to stern and from keel to trucks. New staterooms to the number of 22 are being installed and all her 284 staterooms will be fitted with running wa-

ter. Aboard the CITY OF ERIE, workmen are repairing slight damage done by tugs last fall and the vessel's interior is being repainted. The SEEANDGEE is also being given a thorough overhauling while the STATE OF OHIO, which will take care of the Toledo, Put-in-Bay and Cedar Point route is also undergoing a complete renovation.

D. C. McIntyre, general freight agent of the Detroit & Cleveland line, and Harry R. Rogers, traffic manager of the Cleveland-Buffalo line, recently returned from New York where they attended a conference of rail and boat men. The conference was called for the purpose of laying plans for handling passenger business under conditions brought about by returning the railroads to their owners on March 1.

Cleveland and Buffalo interests are reported to be interested in the purchase of the old wooden steamer VENEZUELA, now docked at Erie, Pa. This vessel is the property of Charles S. Neff, who bought her several years ago.

The Cleveland Erieau Steamship Co., according to Lieut. J. H. Clark, president of this line, hopes to open its season by May 30. If the weather warrants, earlier trips will be made. This line operates the THEODORE ROOSEVELT between Cleveland and Port Stanley. This vessel is undergoing a thorough overhauling at Port Stanley with the object of increasing her speed to 22 knots an hour. A cafeteria, with capacity for accommodating 300 persons an hour, is being installed on the vessel's main after deck, while forward space is being provided to take care of package freight and tourists' automobiles.

The American Shipbuilding Co., Cleveland, recently launched the BACCARAT, a 4000-ton deadweight freight carrier. The craft is of the ocean type, 261 feet long, 43 feet beam, 24.4 feet deep. This type is the largest boat that can go through the system of canals which connects the Great Lakes with the Atlantic seaboard.

The Detroit Shipbuilding Co., Detroit, recently launched the JUVIGNY, an ocean-going cargo carrier of 3550 gross tons. The vessel is 261 feet long, 43.5 beam, 24 feet 2½ inches deep. She is to be fitted with oil burning boilers.

The barge NELLIE REDDINGTON was recently purchased by the Sincennes, McNaughton Co., Montreal, from John

Connelly, ship chandler, Buffalo. This barge was built in Cleveland in 1872, being first rigged as a 3-mast topsail schooner. For many years she was one of the finest sailing vessels on the Great Lakes.

The steamer ALABAMA of the Goodrich Transit Co., went ashore 2 miles north of the piers at Chicago recently. She had to lighten part of her cargo before she could be released. The damage reported was not heavy.

The Port Huron & Sarnia Ferry Co.'s steamer CITY OF CHEBOYGAN, which sustained considerable damage from ice, is undergoing repairs wherein several new planks are being fitted.

The steamer FRANK E. KIRBY has been withdrawn from the Detroit, Lake Erie island and Sandusky route, accord-

ing to a recent announcement. Lack of patronage caused by prohibition is said to be the factor that caused the vessel's owners to take her off that run.

The suit of the government elevator at Port Arthur, Ont., against Hawgood & Avery, former owners of the steamer S. S. CURRY, was concluded recently when Judge Killits in the United States court held the average of 11,000 bushels in the steamer's cargo was larger than contemplated by the old average and deficiency clause and that the vessel was not entitled to retain it. The CURRY loaded at Port Arthur in October, 1914, and had an overrun of 11,000 bushels. The owners of the CURRY appealed the case.

The title of the American Steamship Co. was changed to the Reiss Steamship Co. at a recent meeting of the

directors, who also approved the purchase of the steamers WILLIAM A. REISS, RICHARD J. REISS, CLEMENS A. REISS and OTTO M. REISS.

The steamer A. E. R. SCHNEIDER, formerly the CHARLES R. VAN HISE, which is being lengthened 96 feet at the Ashtabula yard of the Great Lakes Engineering works, will be ready to go in commission by May 1. Her carrying capacity will be about 9000 tons. She will be commanded by Capt. P. E. Rouvel, who last season sailed the steamer CENTRAL WEST.

Winter boats on Lake Michigan are experiencing considerable trouble with the ice and are spending much time in port. A number of vessels have been damaged by the unusually heavy ice which made it necessary to send them to various shipyards for repairs.

Along the Atlantic and Gulf Coasts

THE seventh 600-ton submarine to be constructed at the Portsmouth navy yard, Portsmouth, N. H., was launched recently during a heavy storm without mishap. The new vessel is known as S-7 and was sponsored by Mrs. Margaret M. Wyman, wife of Capt. H. L. Wyman, commander of the U. S. S. OLYMPIA.

The Eastern Steamship Lines, Inc., announces increased service along the Kennebec river valley. A new steamer, THE WESTPORT, will establish a route between Gardner and Boothbay Harbor, Me.

Sixty wooden vessels with a total tonnage of 68,522 were built in Canada during the last year and sent overseas without being registered, according to figures announced by the department of marine and fisheries. There also were constructed 18 steel steamers with a tonnage of 30,000.

The Winnisimmet Shipyard, Inc., Boston, has been chartered under the laws of Massachusetts with a capital of \$1,000,000 to take over the business, plant and property of the Massachusetts concern of the same name. The work of the plant will continue to be the construction, repairing and equipment of ships, docks, and piers. The company's statement shows assets amounting to \$1,900,000.

The ROANOKE, recently launched by the Texas Steamship Co., Bath, Me., has started on her first voyage, sailing for Port Arthur, Tex., where she will load oil for one of the northern terminals of the Texas Co. Capt. A. J. Pattison is the commander and has a crew of 48.

The recent sailing of the steamship ROCK ISLAND BRIDGE marks the inauguration of the service of the Rogers & Webb line between Portland, Me., and

Antwerp and Rotterdam, Holland. The ownership of the new line is a combination of Rogers & Webb, ship owners, and Arthur Lane and R. E. Peabody, formerly with John S. Emery Co., Boston, shipping agents and owners. It is the intention of the new line to maintain a regular sailing service throughout the year from Portland. The cargo is expected to come largely



CECELIA COHEN

from Canadian shippers and will include wheat and other grains from Canadian territory.

The largest marine railway north of New York has just been opened at Chelsea, Mass. The railway is 680 feet long and 70 feet wide and has a capacity for vessels up to 4000 tons.

The barge TABOR, coal laden for Portland, Me., in tow of the tug LENAPE, was sunk recently off Vineyard Haven, Mass., by collision with the steamer DOVER, being towed from Boston to Providence. The TABOR carried 1480 tons of coal consigned to the Maine Central railroad.

What is said to be the largest 1-piece head, marine type, Scotch boiler in the

world has recently been built at the Winnisimmet shipyards, Chelsea, Mass. The new boiler has a diameter of 15½ feet across its 1-piece head. The boiler was built for the Coastwise Coal Co. and will be used on the steamer SELWYN EDDY.

A 500-foot floating drydock is now under construction at the Fore River yards of the Bethlehem Shipbuilding Corp. The new dock will be 130 feet wide and will have a lifting capacity of 10,000 tons deadweight. It is for use in aiding the repair work at Boston harbor and it will mean that much work which now has to be sent to New York will be taken care of at the Boston port. The new dock will be of the floating individual pontoon type and will be equipped with 20-centrifugal pumps which will enable the drydocking operation to be made in 30 minutes.

The 4-mast schooner CECELIA COHEN recently was launched from the Percy & Small yards, Bath, Me. She is the forty-fifth vessel to be built at the Bath yards, is 199 feet long, 38.4 feet beam, 19.2 feet deep and has a gross tonnage of 1102. She will probably be used in the African trade.

The Mobile Shipbuilding Co., Mobile, Ala., recently launched the OKLAHOMA CITY, fourth of eight steel vessels being built for the Emergency Fleet corporation.

The impossibility of making full use of the \$20,000,000 New Orleans Industrial canal without a channel connecting it with the gulf, has become so apparent that the board of port commissioners and several of the commercial bodies of New Orleans have taken up with the war department, the question of dredging a channel through Lake Pontchartrain to Mississippi sound, whence there is deep water connection with the Gulf of Mexico. This will put the port 40 miles closer to the sea than by the present

course of 100 miles down the river, and will eliminate the constant battle with the current of the Mississippi by incoming steamers for all this distance. It has also been asked that the Industrial canal be given a regular place in the intercoastal canal system by the federal government.

* * *

Recently, notice was published of the sale of the Providence, R. I., plant of the American Ship Windlass Co. and the resulting discontinuance of the company's old line of windlasses. The American Engineering Co., Philadelphia, points out that it was formed about 10 years ago from a consolidation of the American Ship Windlass Co. and the Williamson Bros. Co. Since that time windlasses or steamship auxiliaries have not been manufactured at the Providence plant.

* * *

An example of the need for barge service on the Mississippi river was given in March, when the steam towboat, BIG BARRETT, of St. Louis, reached New Orleans with 10 barges, loaded to capacity with cargo from St. Louis and Memphis. River men estimated that this cargo would have required 200 freight cars or six 3500-ton steamers. It was all delivered in good shape by the 10 barges. Six barges were towed on the return trip, each loaded to capacity.

* * *

Contract for dredging the 37.5-mile section of the Intercoastal canal, between the Mermentau and Calcasieu rivers, Louisiana, has been awarded to the Lake Arthur Dredging Co., by the United States engineers, and work has been commenced. The home office of the dredging company is Beaumont, Tex., and the price involved is \$144,000 or approximately 12 cents a cubic yard. The material to be removed is mainly mud and soft silt. Work also has been begun by a government dredge on deepening and widening Bayou Black, the

link of the Intercoastal canal between Morgan City and Houma, La. The channel is to be 40 feet wide at the bottom with a minimum depth of 5 feet. This width is later to be increased to 90 feet and the depth to 9 feet.

* * *

Direct steamship connection between Singapore and the Straits Settlements and New Orleans was established late in February with the arrival in the Louisiana port of the Osaka Shosen Kaisha steamer PANAMA MARU, with full cargo of rubber and gum from Singapore. This steamer will maintain regular schedule direct between the Straits and New Orleans, eliminating the long rail haul from San Francisco formerly necessary for cargoes from those Oriental ports.

* * *

Beginning Feb. 15, one self-propelled steel barge has been launched weekly for the Alabama-New Orleans service of the government operated barge lines. They were built at St. Louis, and the four first to be launched were named BIRMINGHAM, TUSCALOOSA, MOBILE and GULF-PORT.

* * *

Clooney Construction Co., Lake Charles, La., is constructing at Lockport a fleet of six 500-ton wooden barges to be used in bringing sugar from Cuban ports to New Orleans. They will be towed, singly, by steamers between Havana and Crescent City. They are being built for order of Cuban sugar producers, and will set a record as long-distance ferries if their use proves the success it is expected to be.

* * *

Doullut & Williams Shipbuilding Co., Inc., New Orleans, launched its second 9600-ton steel steamer for order of the United States shipping board, recently. It was christened POTTER, and will be ready for service about the end of March. The launching was made side-

wise into the completed part of the Industrial canal. Six sister hulls are being constructed, the next to be launched, WICHITA, being expected to go over about the end of March. Much of the machinery is being placed in these hulls before they are launched.

* * *

Increase of 1½ to 3 cents a ton in wharf and dock fees as inaugurated Jan. 1, will yield the board of commissioners of the port of New Orleans approximately \$500,000 more income this year than last, when \$807,000 was taken in from this source.

* * *

The fabricated steel shipbuilding industry is in the South to stay, largely because of cheaper transportation of steel and coal by water, of cheaper labor and of more open-air working days to the year, according to J. B. Ewin, chief engineer of the Doullut & Williams Shipbuilding Co., Inc., speaking before the Louisiana Engineering society at New Orleans recently.

* * *

Hodge Ship Co., operating the 3500-ton steamer NIKA between New Orleans and Ecuadorian ports, has obtained the contract to carry United States mails to Guayaquil for trans-shipment to other ports on the west coast of South America. Hitherto, this mail has been sent by steamer to Colon and thence trans-shipped.

* * *

Appraisers have begun a survey of the concrete shipbuilding plant operated for the government by the Fred T. Ley Co., Mobile, Ala., with a view to rendering a valuation on which as a basis, Mr. Ley and his associates may purchase the plant. Two concrete ships have been launched there and three more are being constructed. W. S. Kinnear and J. D. Davies, New York, and Charles A. Pohl, engineer of the Emergency Fleet corporation, are making the survey.

* * *

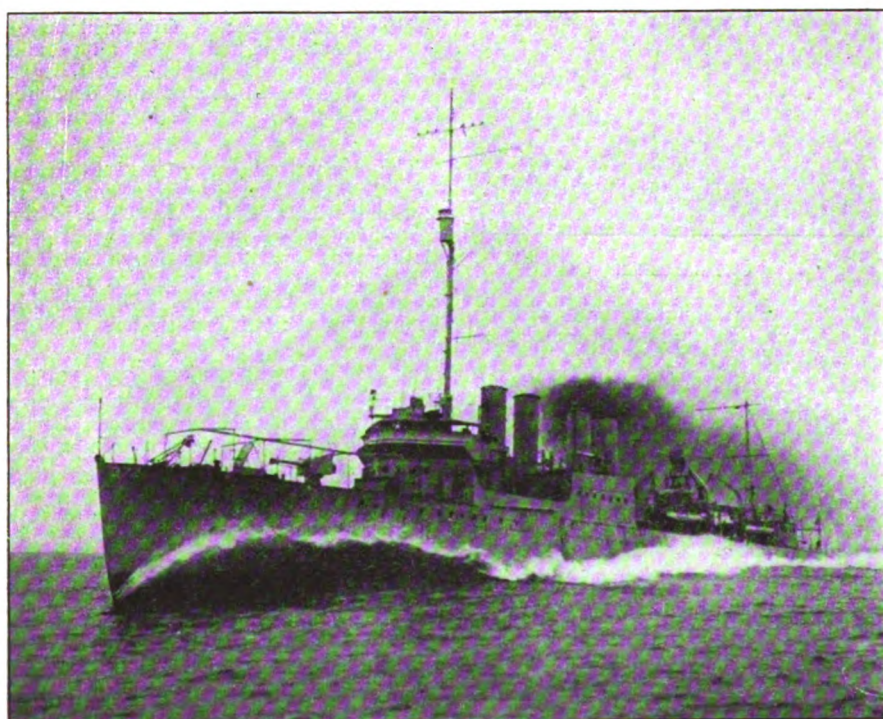
Commercial organizations of New Orleans, headed by the board of commissioners of the port, will present a constitutional amendment to the next session of the general assembly in May, at Baton Rouge, providing for an open bond issue of \$10,000,000 for constructing new wharves, complete ratproofing of the port, as demanded by the United States public health service, and improvement of loading and unloading facilities on the harbor front.

* * *

Stockholders of the Yarn Naval Stores Co., with plants at Savannah and Brunswick, Ga., and Gulfport, Miss., have agreed to pay off immediately all outstanding indebtedness, and assume all claims inherited from the old corporation, the receivership or the trusteeship, under which various forms the company has been operating for some time. This action means that the company will continue to operate and that its three plants will not be sold under court order, which action was asked of the court by the corporation's creditors.

* * *

Strict application of federal quarantine regulations is being made to all craft, no matter how small, operating in and out of New Orleans and other gulf



DESTROYER REID BUILT AT THE BETHLEHEM YARDS, QUINCY, MASS., IN 45 WORKING DAYS
THIS CRAFT LOGS 35 KNOTS AN HOUR

ports in interstate trade. Complaints have been received by Dr. J. C. Lombard, of the public health survey, from Mississippi ports that small craft, especially power freight boats, clearing from Louisiana ports are not observing quarantine rules, and Dr. Lombard has ordered that rat guards must be used and each boat fumigated before it leaves a Louisiana port.

The Foundation Co. will continue operation of its New Orleans shipbuilding plant after completion of the five all-steel ships it is building for the

French government, according to announcement by H. D. Bacon, manager of the plant. The company expects to get a share of the 800,000 tons of shipping, contracts for which are being placed in the United States yards by representatives of the French government, for this yard at New Orleans, where 2500 men are employed.

For the first time since March, 1900, Memphis is shipping cotton by water to New Orleans. This time the government barge line on the Mississippi river is handling the shipments, and

the first consisted of 150 bales. The Memphis cotton exchange is making the shipments, and others are to follow continuously.

Masters, pilots and engineers on all the railway ferries at New Orleans have received wage increases amounting, on the average to 20 per cent. The masters will receive \$220, first mates \$180, second mates \$170, chief engineers \$207.50 and their assistants \$180, all wages being monthly. Employees of the passenger ferries are not affected.

Up and Down the Pacific Coast

SHIPMENTS of lumber by water from the Pacific northwest during the calendar year 1919 totaled 1,365,004,362 feet. This includes lumber sent both coastwise and foreign and is a gain of 223,839,425 feet over 1918. Last year's record is about equal to that of 1908 but it falls considerably short of the record established in 1912 when total shipments were 600,000,000 feet more than in 1919. The state of Washington continues to lead the northwest, shipping more than half of the district's total or 787,377,776 feet which is a gain of 149,184,222 feet over 1918. Oregon's gain last year was 54,327,052 feet while British Columbia's shipment increased 20,328,151 feet. In 1919 California took 223,839,425 feet more lumber from Oregon and Washington than in 1918.

Direct freight and passenger steamship service is contemplated from Tacoma, Wash., to the Orient, according to announcement by the incorporators of the Sigsbee-Humphrey Pacific Co., which has just been formed with a capital of \$1,000,000. At the present time, Tacoma is undertaking extensive terminal improvements, the port of Tacoma utilizing a large section of water frontage in building terminals. Directors in the new steamship company include William R. Rust, Tacoma capitalist; Gen. Charles F. Humphrey, Washington; George H. Raleigh, Tacoma banker, and F. P. Haskell, secretary to Hugh C. Wallace, ambassador to France. General Humphrey is to be president and Ross S. Sigsbee, New York, vice president. The company is making application for the allocation of shipping board carriers for the route.

What is expected to be a big addition to the commerce of Seattle is the movement of crude rubber and other products of the Straits Settlements and Dutch East Indies which will be inaugurated with the establishment of regular service between that port and Singapore. The Pacific Steamship Co. has arranged for a monthly service to Singapore with shipping board carriers. This service will be in addition to the company's present extensive fleet of vessels now operating to Japan, China and Manila. Rubber, tin and other products are shipped in large quantities from Singapore and there is a good demand for lumber, box

shooks, flour, fruit and other commodities of the Pacific northwest. Four vessels are to operate on this route.

The last steel steamship built in Oregon on government account, the 9500-ton BEARPORT, has been launched at Portland, Oreg., and has had her trial run. The BEARPORT completes the war shipbuilding program in the Oregon district and leaves the steel yards idle with one exception where several private contracts for tankers have been taken. The BEARPORT has been assigned to carry flour to the Near East for Armenian relief.

The little power schooner BENDER BROS., whose home port is Seattle, has been sold to Wittenberg & Seidenberg of Nome, Alaska, and is hereafter to be used in trading along the Siberian coast out of Nome. For years the BENDER BROS. has braved the gales of the north Pacific and the ice of Bering sea and the Arctic ocean in trading and carrying relief expeditions. In preparation for the new trade, the famous vessel is being rehabilitated at a local yard but will soon be on her way north.

Largest steam schooner of the north Pacific, the wooden carrier CITY OF EVERETT, constructed by the St. Helens Shipbuilding Co., St. Helens, Oreg., was launched recently. She will go into the coastwise service and will engage in carrying lumber for which she is especially adapted. Other vessels of the same type are likely to be built at the same yards while C. Frazier Matthews, of the Matthews Shipbuilding Co., Hoquiam, Wash., has announced that his yard has several wooden contracts in prospect. The details are not yet ready for publication.

After lying waterlogged and damaged for months at Papeete, the auxiliary wooden schooner LAUREL WHALEN is to be towed from the South Seas to Vancouver, B. C., making one of the longest tows in the annals of Pacific shipping. Twenty months ago the LAUREL WHALEN left Australia with a cargo of wheat and tallow. The vessel met bad weather, had engine trouble and finally put into Papeete in distress. Her cargo was badly damaged in the hot weather of the

tropics. It was transshipped and now the vessel is to be brought back to Vancouver at the end of a hawser.

Work was started early in March on the new drydock which is to be built at Vancouver, B. C. The contract has been awarded to J. J. Coughlin, of the Coughlin shipyards which are finishing a contract for a fleet of steel steamers. The dry dock will be 750 feet in length with a beam of 110 feet. Its cost will approximate \$3,750,000.

First of a fleet of four steel steamships built in British Columbia, the Canadian IMPORTER has sailed from Vancouver, B. C., for Australian ports. It is planned to maintain regular service, the enterprise being backed by the dominion government. The CANADIAN INVENTOR, CANADIAN EXPORTER and CANADIAN PROSPECTOR will follow as soon as they are completed.

In the last six months about 50,000 Chinese coolies have been carried across the Pacific to their homes. These men were employed in northern Europe during and after the war. They are being sent home through British Columbia ports by the British government. The last party left Vancouver in March. Now it is planned to transport thousands of Czechoslovaks from Vladivostok to Vancouver and thence to Europe. This movement is to be undertaken by Great Britain and France and it is expected that the Pacific liners which have carried the Chinese westbound will be occupied for months bringing the Czech refugees to the north Pacific. There is no outlet for them through Siberia, consequently it is necessary for them to cross the Pacific.

The first consignment of Douglas fir even sent to northern Africa from the Pacific northwest will soon be shipped from Portland, Oreg. This will go on the French steamship MONT CERVIN and it is expected that additional orders will be forwarded on vessels of this new line connecting the north Pacific with Mediterranean ports. On the MONT CERVIN 2,000,000 feet of lumber is being shipped from Vancouver, B. C., to Cuba.

Practical Ideas for the Engineer

Completes Mississippi Jetties—Designs Ship's Log—Novel Channel
Sweeper—Remaking Old Vessels—Builds Deck House in Plate Shop

FROM now on, the Mississippi river will be able to brush its own teeth, no matter how much mud and silt its heavy flood torrents may bring down from the Mississippi valley to the Gulf of Mexico. Its busiest mouth, Southwest pass, has been narrowed and confined into a channel 35 feet deep, instead of 9 feet. This channel will scour itself of all sand and silt every day.

The Mississippi has three mouths through which commerce passes—Southwest pass, which takes 50 per cent of the traffic, South pass, which handles about 14 per cent, and Pass a'Loutre, which takes care of the balance. South pass is the channel of yesterday, still hanging on to today; Southwest pass is the channel of today and tomorrow. Pass a L'outre has been so endowed by nature that it needs less of man's care than either of the other two. In 1899, marble jetties were run out from South pass to make a channel more than a mile wide into the gulf. This channel was so wide that it would not clean itself. Therefore, wooden bulkheads were constructed inside these jetties, making a channel 1000 feet wide and 35 feet deep, which cleans itself of silt and sand.

To Spend \$12,000,000

In 1902, another project was approved which called for the expenditure of \$12,000,000 and included the development of a narrow, self-cleaning channel in Southwest pass. It is this project which is nearing completion by the construction of 22,900 linear feet—more than 4 miles—of wooden sheet piling bulkhead, inside the jetties of Alabama marble. Nearly 200 men, 13 cargo barges, 3 tugs, 3 floating derricks and 2 floating pile drivers, are doing the work under direction of Lester F. Alexander, who has the contract with the federal government. All the boring and bolting is done by compressed air hammers whose compressors are carried on barges, while the stone with which the double bulkheads are filled is carried down the river on barges from New Orleans. Virtually all of it comes from the Gantt quarries in Alabama, but recently, when the old 4-story cotton exchange building in New Orleans was wrecked, the great blocks of granite from that structure were dumped into these bulkheads,

as were some of the greater than life-size figures of stone which adorned the cornice of the exchange.

The jetties run parallel to the currents in the passes and the bulkheads which narrow the channel, run parallel to the jetties, forming a tube which the force of the confined current keeps clean. This channel has deepened itself from an average of 9 to 35 feet, deep enough for all but the largest of transatlantic ships to enter New Orleans. The jetties are composed of green willow tree mattresses, 200 feet wide and from 500



COMPLETED WOODEN JETTIE AT THE MOUTH OF THE MISSISSIPPI

to 2000 feet long, bound together with netting of wire cables and sandwiched between layers of stone, the whole capped with a layer of 5-ton blocks of Alabama marble. They form gleaming white lines, extending 4 or 5 miles out into the gulf, and visible for miles at sea.

Bottom sills and mattresses of willow are put in to cut off the flow of water to the gulf through the Jump, and through Cubit's gap, as well as through Pass a'Loutre, so as to give all the current possible through South and Southwest pass. This is accomplished by building low dams on the

mud bottom of the river. They are composed of willow mattresses, weighted down with rock. Willow is used for two reasons, first, because it is abundant and easily obtainable from all the swamps along the lower river, and, second, because it is virtually indestructible when kept permanently under water. The willow mattresses now being completed at the head of the passes, where a small town has been built for this \$12,000,000 job, are 200 feet wide and made in sections from 500 to 2000 feet long, the generally accepted and most available size being 200 x 1900 feet. They are woven on a large barge, rolls of green willow, leaves, branches and trunks of small trees, being laid side by side on long warps of $\frac{1}{4}$ -inch wire. Each roll is bound together with band iron, and the whole interwoven to the wire warp by a woof of other wire tightened by long levers in the hands of husky negroes.

Laying the Mattress

The completed mattress is rolled off the end of a barge like a carpet off a loom, and the weaving barge retreats as the mattress falls into the water, barges carrying stones weighing from 15 to 100 pounds each following and dropping the stone in a continuous layer on the mattress at the bottom of the river. As the end of one section of the mattress is reached, the stone-carrying barges in their turn retreat and the weaving barge follows them to lay another mattress on top of the layer of stone. The stone barges again follow, dropping another layer of rock, until the sandwich of willow and stone is of the thickness the engineers have decided sufficient to cut off the current, or to deflect it into the channel they wish it to follow. On top of the uppermost mattress of the several layers is deposited a layer or two of 5-ton blocks of stone, the whole making a submerged wall well anchored to the mud of the stream.

Spur dikes, of similar construction, are scattered all up and down the passes, serving as traps in which the silt and earth collects along the main jetties and the artificial banks of the river, slowly but surely building up solid land, and forcing the main current out between the bulkheads to keep its channel scoured and clean. A motor tug is constantly engaged



DIPPER OF ONE OF THE HUGE DREDGES USED IN DREDGING A CHANNEL THROUGH SOUTHWEST PASS

in making soundings along these bottom sills and spur dikes. The results of its work show this land to be rising constantly from the bottom of the river, so that, in the course of a few years, two parallel banks of soil will extend out into the gulf where now there are only stone jetties and timber bulkheads.

South pass is the narrowest of the entrances to the big river. It is 14 miles in length, from the head of the passes to the open Gulf of Mexico. It has an average width of 700 feet. The gulf entrance is 107 miles from New Orleans. It was not much used until Capt. James B. Eads and his associates contracted with the government some 40 years ago to make a channel 200 feet wide with a minimum depth of 26 feet and a depth of 30 feet for an undetermined width in the center, and to maintain this for 20 years. They did this, though the depth at the bar when they undertook the work was only 9 feet. They paid 20 per cent for the money with which they did it, yet, when the government took over this contract in 1901, the average depth in the channel was 31 feet, 5 feet more than Eads and E. L. Corthell had agreed to deliver.

Many Engineers Employed

J. L. Hortenstine, Lester F. Alexander and John L. Dickey are doing the work today which Eads and Corthell did 40 years ago. The government men who are supervising it are Col. J. C. Sanford, district engineer for the gulf division; T. E. L. Lipsey, district engineer for the New Orleans district, and about a score of agents, measurers, inspectors, gagers and

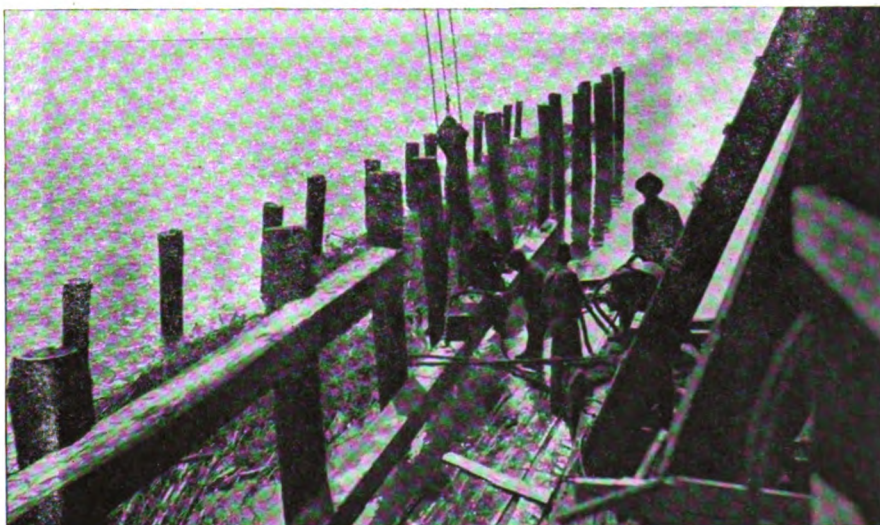
other men who know their special business at every corner of the jetties and bulkheads. The first improvement of Southwest pass was made in 1836. It was kept up by more or less desultory dredging until 1873, when Eads and Corthell went to work on South pass with their jetty project and this pass became the gateway to the Mississippi. Then, in 1902, government engineers decided that Southwest pass would have to be developed for the future. They planned a channel 1000 feet wide and 35 feet deep at mean low water at an estimated cost of \$6,000,000 and \$150,000 a year for maintenance, but they later decided to put on a greater system of improvements that ran the estimated costs to \$12,000,000 for construction, and \$300,000 a year for maintenance, thus insuring high efficiency.

It is now estimated that the lowest practicable annual outlay for maintenance may be attained by the expenditure of another \$3,000,000. These later improvements consist of spur dikes and two timber bulkheads—inner jetties—extending from Burrwood to the end of the jetties, 4 or 5 miles out in the gulf, where the mean depth of water is at least 35 feet.

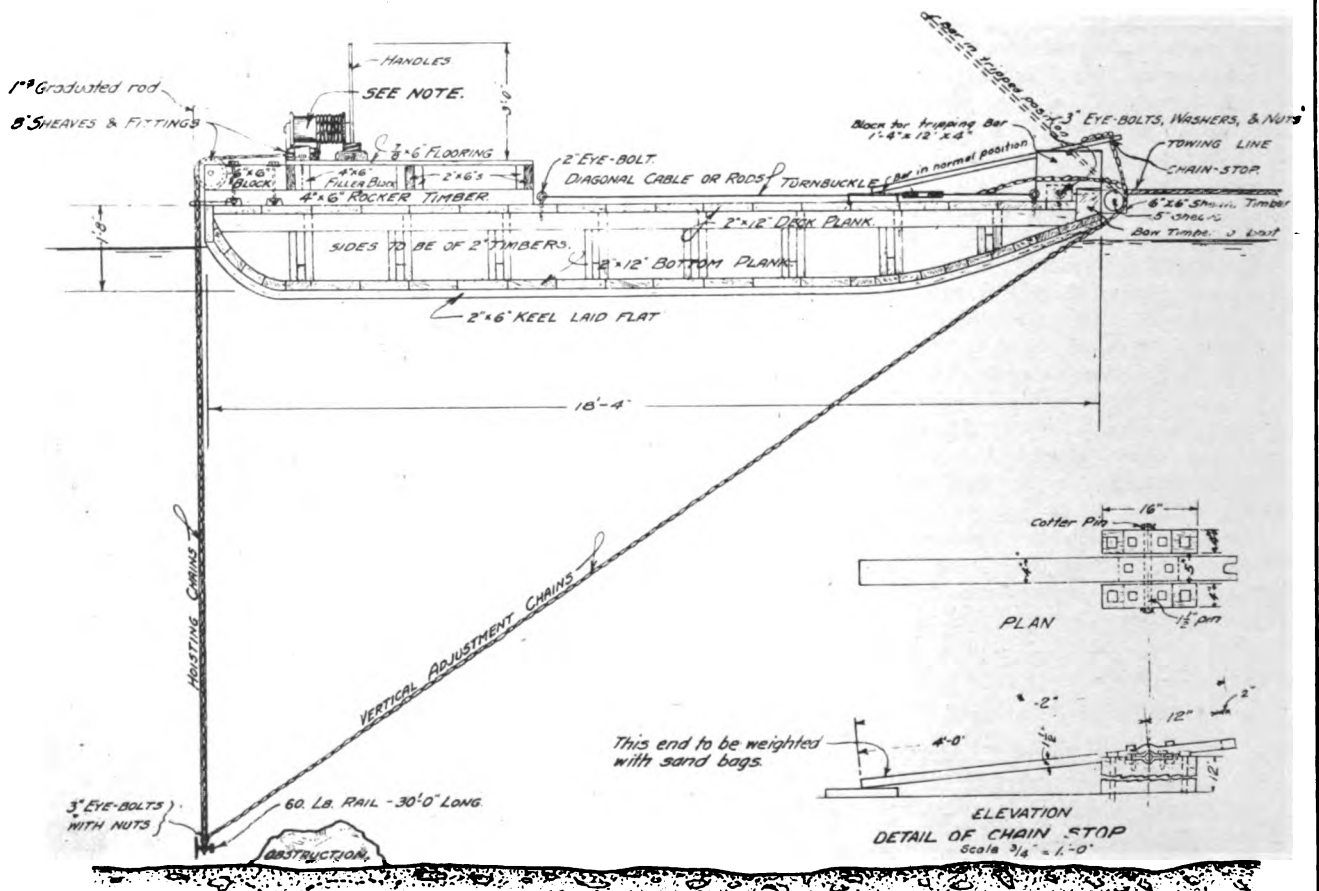
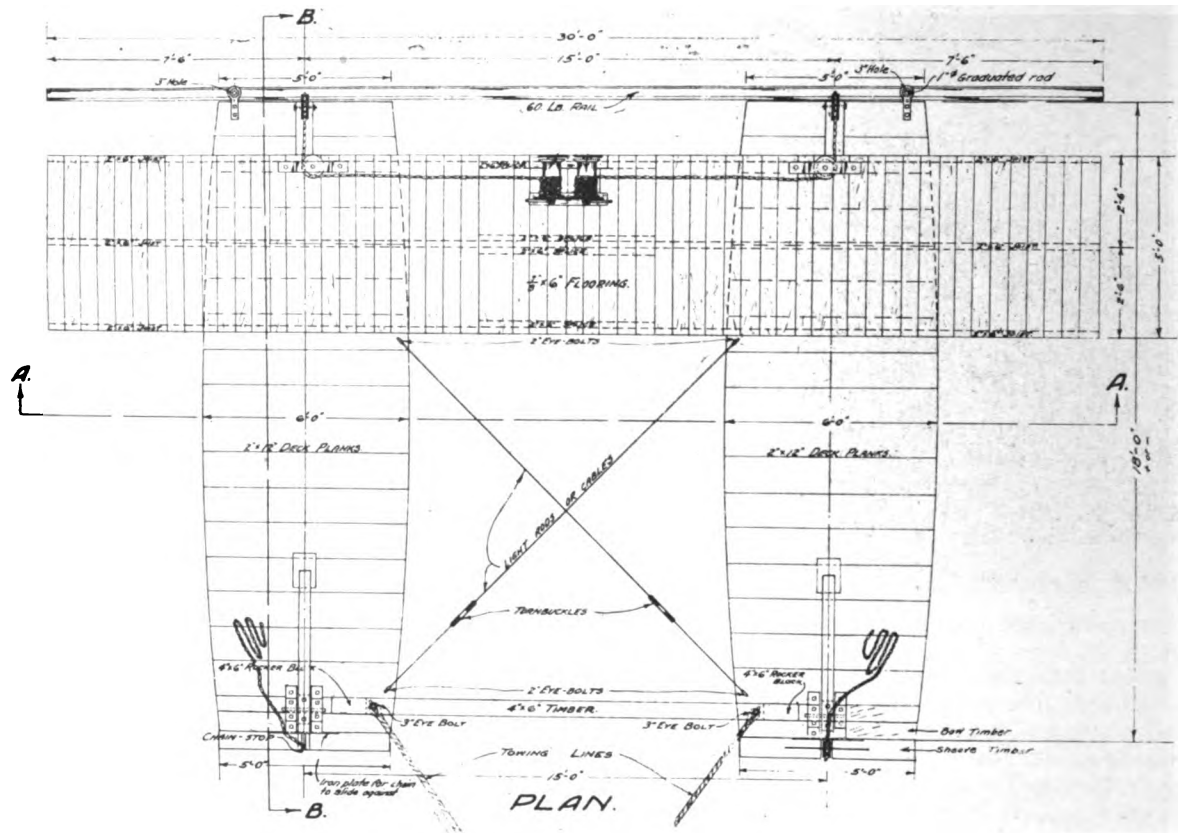
Bulkheads Are Heavy Timbers

The bulkheads are heavy structures of creosoted timbers, 14 x 14 inches, and from 40 to 60 feet long. The sides toward the channel are of sheet piling, a type of interlocking, continuous water-fence, solid below the mean water line and cut open above at alternate timbers to permit the upper waters to flow freely through and to relieve the bulkhead of the strain of the waves which come rolling in from off the gulf. Between these bulkheads will be a channel 1000 feet wide, approximately half as wide as is the river at New Orleans, and one-third as deep, yet deep enough to handle any shipping save the very largest of transatlantic liners. Inside the sheet piling, one 6 feet above and the other midway between low and mean high water levels, are longitudinal connecting timbers, walings bolted firmly to the heave piles driven far into the bottom of the stream. Inside of this whole fence, is a supporting row of piles, driven at an angle, still further to strengthen the bulkhead against the waves. The combined lengths of these bulkheads are 52,250 lineal feet, or virtually 10 miles.

The first cargo of creosote from Europe since the beginning of the war arrived at Seattle recently.



LAYING DOWN THE MATTRESS OF GREEN WILLOW AND WIRE ON WHICH STONE IS AFTERWARD PLACED



THE UPPER ILLUSTRATION IS A PLAN OF THE CHANNEL SWEEPER WHILE BELOW IS A SECTIONAL VIEW THROUGH ONE OF THE FLOATS

Designs Ship's Log

A new apparatus for registering the speed of vessels has been developed by the American Navigator Log Corp., New York. A description of the apparatus has been given by the company as follows:

The log works on the principle of the pitot tube. It has a bottom-cock with pitot tube and a membrane apparatus for taking out the difference in the speed pressure and the balance pressure of the vessel, that is, the pressure resulting from the draft of the vessel. Thus, the speed of the vessel is registered on the mother apparatus below the waterline. The distance traveled is transmitted electrically to the bridge, or any other place or places desired. The pitot tube used might be put anywhere on the vessel below the water line. The log is said to begin to act at low speed, 1 to 1½ knots. It is pointed out that the log is well protected, does not require frequent adjustments, refilling, winding, etc., and is of small dimensions, weighing only 80 pounds. One of these logs has been installed on the United States shipping board steamer HURON.

Meets Fuel Emergency

Chief engineers of deep-water vessels often are called upon to exercise unusual ingenuity in meeting fuel prob-

lems and an account of how the steamer OGONTZ, a Hog Island product, met the emergency when her supply of fuel oil ran short is interesting. The OGONTZ left New York, Aug. 15, 1919, with general cargo, calling at 12 African ports, discharging and picking up general cargo such as rubber, cocoa beans, mahogany logs, etc.

When the ship sailed from New York there were stowed away 'tween decks 2500 gallons of fuel oil, to obviate the vessel taking oil at foreign ports. A number of barrels broke and others leaked. While the vessel was lying at Matadi, Belgian Kongo, Chief Engineer Hilton, realizing that the vessel was running short of fuel oil, had the port boiler changed so that coal could be burned under it.

Pieces of channel iron were obtained and plating cup up for grate bars, then brick piers were built for the bars to rest on, which, in turn, supported the grate bars. All of this work was done by the engine-room force in 21 hours.

After the grate bars were in place, the fire brick arches were removed for oil burning, and pieces of sheet iron were cut up for fire doors, after which the boiler was used as a donkey boiler, supplying steam for auxiliary machinery when the vessel was discharging and receiving cargo. On the vessel's arrival at Las Palmas, the boiler was again changed for oil burning and

the vessel made the return passage across the Atlantic with three boilers using fuel oil.

Wireless Alarm Bell

The American chamber of commerce in London reports a novel wireless emergency calling device by which ships in distress can ring alarm bells on other ships within wireless range. The existing wireless system of communication requires that the operator must be on duty, wearing the usual telephone headpiece. This new device will enable any station or ship equipped with a special automatic transmitter key to call up any station or ship within range, fitted with a corresponding selective receiver relay even if the operator is absent.

The calling up is effected by a powerful bell which starts ringing on the ships called a few seconds after the key at the calling station is pressed. Attention once attracted, communication proceeds by wireless in the ordinary way.

It is claimed that one of the most important uses of the device will be to insure immediate and general attention to S. O. S. calls. The American chamber understands that experiments carried out at the Chelmsford works of the Marconi Wireless Telegraph Co. established perfect communication with a station representing a ship in distress.

Novel Sweeper Locates Obstructions

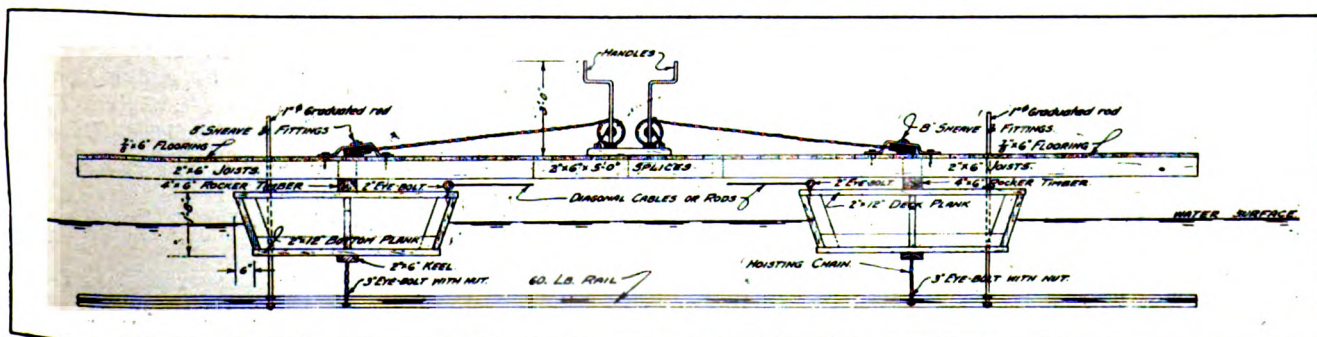
ONE OF the most serious problems encountered on the New York state barge canal system is that of keeping the required depth of 12 feet in the river and lake sections which make up the greater part of the waterway and to locate obstructions that are washed into the canal bed during the heavy spring floods which sweep through the Mohawk and Oswego valleys. To aid in locating these obstructions, Frank M. Williams, state engineer of New York, has designed a novel channel sweeper. Estimates on

three of these sweepers are being secured. This device is shown in the accompanying illustrations.

The sweeper consists of two wooden boats, each 18 feet long and 6 feet beam which are placed 15 feet apart and held in this position by timbers. An operating floor, 30 feet long and 5 feet wide, is constructed near the stern. This floor extends between the two boats and over their sides while located upon it are the winches and other devices for operating the chains holding the rail which locates the obstacles.

This rail is 30 feet long and weighs 60 pounds, being suspended from the floor by means of chains running through sheaves and attached to winches so that the rail can be raised or lowered to any desired height or depth beneath the surface. This rail is also provided with two graduated iron rods running through eye holes located in the floor.

Extending from each end of the rail is a chain which runs in a vertical position to the bow of each boat, passing through a 5-inch sheave and thence through a notched steel tipping bar, 4



THE RAIL USED FOR LOCATING OBSTRUCTIONS IS RAISED AND LOWERED BY CHAINS CONTROLLED BY WINCHES

inches wide. The bar is held in a slanting position on a wooden block, the free end being weighted down by sand bags.

The sweeper is towed through the channel at slow speed, the rail being lowered to a depth of 12 feet. If this hits any obstruction it will swing backward pulling on the two chains extending to the bow of each boat, the pressure on these tipping the bar which will then be raised releasing the chain in the notch at the end.

When this happens, the sweeper will be stopped and the operators will raise

the extensive refitting work recently done by the Morse Dry Dock & Repair Co., Brooklyn, N. Y.

The Italian ship *SPICA*, which for 41 years was a sailing vessel is now equipped with three diesel engines of different types. She has a fuel capacity for a 15-day cruise. The *SPICA*, equipped as she is, left the Morse yards recently under power and after 41 years under sail.

Of the engines installed in this ship, the main one is a Southwark-Harris, 2-cycle, reversible type, with 385 brake and 625 indicated horsepower. The

NEPTIS towed to the yards of the company, where she was fitted from keel to truck.

The *MANDALAY*, once a fast boat in the port of New York, was known as "The Express," because she was a train ferry between Mott Haven and New Jersey. This ship continually raced against time, for in the days before the Pennsylvania tubes, it was necessary for through trains from New England to points south to be run on "The Express" to the Jersey shore, where they again took the tracks. Burned to the water's edge in 1914, the *MANDALAY*, or what was left of her, came to the Morse yards, and is today one of the finest river steamers afloat.

And now the *POWHATAN*, considered a total loss by her owners and underwriters, will soon steam away from the Brooklyn yards of the Morse company. She was a sunken hulk with a record for government service during the Spanish-American war. From the bottom of Chesapeake bay where she lay after a collision, the *POWHATAN* is gradually becoming a steamship of which any seaman might be proud.

Constructs Deck House in Plate Shop

In the reconversion of the troopship *ANCON* in the Brooklyn, N. Y., yards of the Morse Dry Dock & Repair Co., a new deckhouse was included in the requirements of the contract. This deckhouse is 38 feet long, 20 feet wide and 7 feet high, all steel. The house was erected and assembled in the large plate shop of the Morse company in less than five days and included even the punching of holes in the bottom angle iron, so that the six sections might be hoisted aboard ship and fastened permanently. This is probably the first time that an all-steel deckhouse was built and assembled in a plate shop. The rapid rate at which the work was handled was due, of course, to the fact that the material was instantly available and no transporting between shop and ship was required.

Late Marine Patents

Copies of any of the following patents can be obtained by sending 25 cents in stamps to Siggers & Siggers, National Union Insurance building, Washington, by mentioning *THE MARINE REVIEW*:

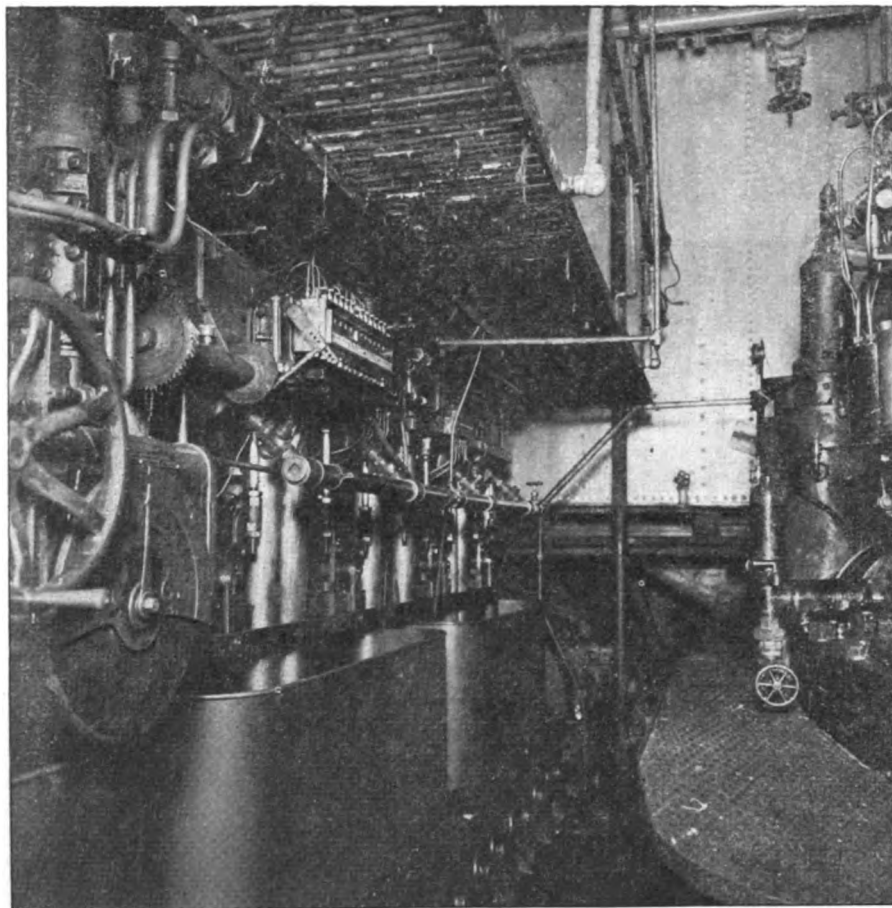
1326484.—Machine for spreading heavy coatings on ships and the like, Daniel A. Doran, Yonkers, N. Y.

1326558.—Ship protector, Frank Zebrowski, Cleveland.

1326575.—Noncapsizing lifeboat, Luda Cizek, Detroit.

1326701.—Propeller, P. M. Weddell, San Jose, Cal.

1329921.—Boat davit, W. F. Mills, San Francisco.



ENGINE ROOM OF THE AUXILIARY SHIP *SPICA*

the rail until it clears the obstruction, the figures on the graduated rod showing the height of the obstruction above the normal 12-foot depth. Sealed cans, painted red, will then be anchored at the obstruction which will be removed by the dredges following the sweeper. In the event of a sand bar or other serious obstruction being encountered, soundings will be made to determine its extent.

Remaking Old Vessels

All the vessels that go to swell the total of the American merchant marine are not new craft by any means. An illustration of this is seen in some of

auxiliary engine used to drive the air compressor is a Gulowsen Grei semi-diesel marine type. The bilge pump is driven by a single-cylinder Novo diesel engine.

Another example of almost complete conversion and one of considerable interest is that of the *NEPTIS*, an old Brazilian sailing ship which parted her line while being towed from Rio de Janeiro to New York. Lost at sea, she was later found by a United States revenue cutter which attempted to tow her. The task proved futile and the *NEPTIS* again became a derelict until she was picked up by the *DAVY JONES*. This boat, too, was having trouble when Morse tugs were called on and the

Equipment Used Afloat, Ashore

Boring Machine—Drilling Square Holes—Lighting Outfit—Reverse Gear—Water Heater—Arc Welder—Steam Trap—Gang Drill

ADAPTABILITY to several boring, drilling and tapping operations at one setting of the work is one of the salient features of the horizontal planer type drilling machine shown in the accompanying illustrations. This tool is a recent development of the Milwaukee Electric Crane & Mfg. Co., Milwaukee.

The machine consists of a substantial bed on which the platen travels, while the spindle is carried in a housing that travels up and down the column at the right. This column has a traverse movement on its bed. The platen is 9 feet long and 4 feet wide, equipped with six T-slots for strapping work in place. It travels over the bed on substantial ways, being actuated by means of a screw feed.

The spindle is high carbon steel, accurately finished. The front bearing is $2\frac{1}{2}$ inches in diameter and $7\frac{1}{2}$ inches long while the middle bearing is $2\frac{3}{4}$ inches in diameter and 6 inches long. The driving end is $2\frac{1}{4}$ inches in diameter, the drive being through the medium of two beveled keyways. The front end of the spindle is fitted with a ball thrust bearing and a No. 5 morse taper. The spindle quill is semisteel, $4\frac{1}{8}$ inches in diameter, with substantial rack teeth arranged so that the drive is cut out automatically when the spindle reaches the end of its extreme range. This feature eliminates the pos-

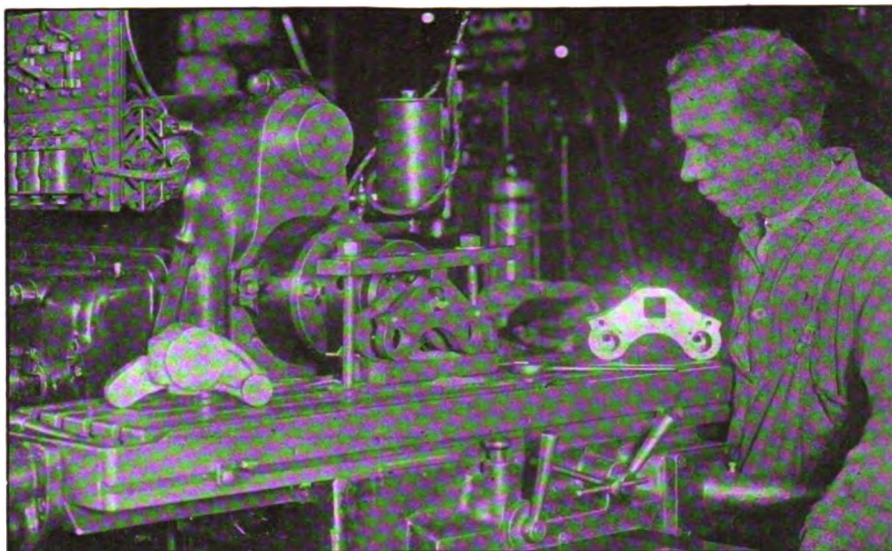


FIG. 3—SQUARE HOLE DRILLING ATTACHMENT ON MILLING MACHINE CUTTING SQUARE HOLES WITH ROUNDED CORNERS

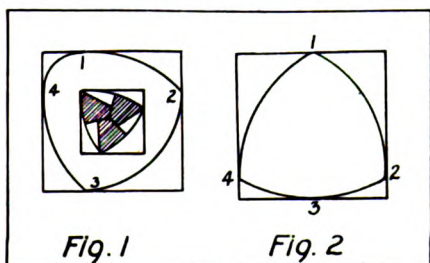


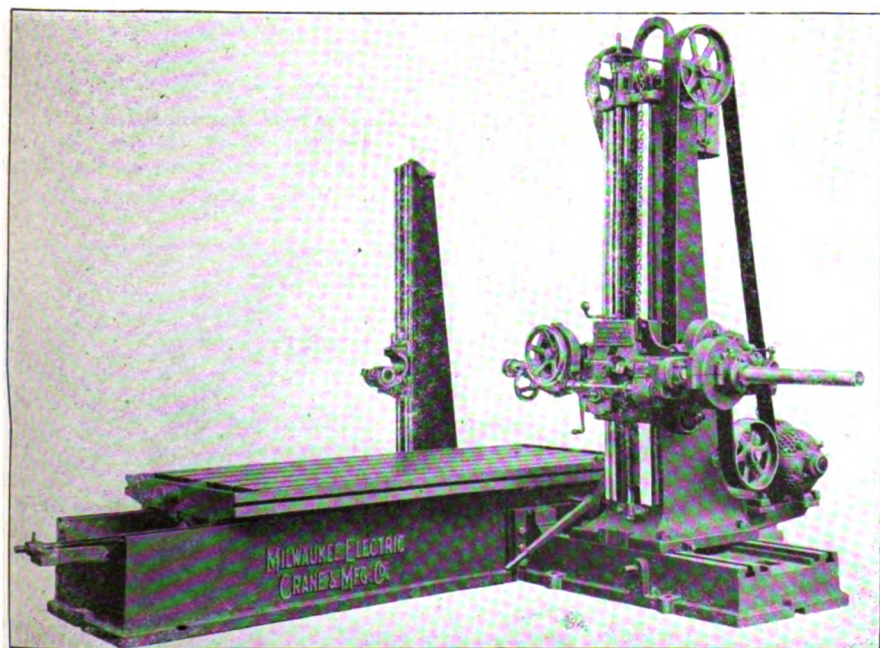
FIG. 1—SHAPE OF SHANK OF DRILL FOR SQUARE HOLE WITH FILLET FIG. 2—CROSS SECTION OF THE SHANK FOR HOLE WITH SQUARE CORNERS

sibility of stripping the feed mechanism. The spindle is geared for standard speeds of 20 to 400 revolutions a minute. All gears are steel with accurately cut teeth. Standard spindle feeds are 9, 14, 20, 30, 50 and 70 thousandths of an inch per revolution.

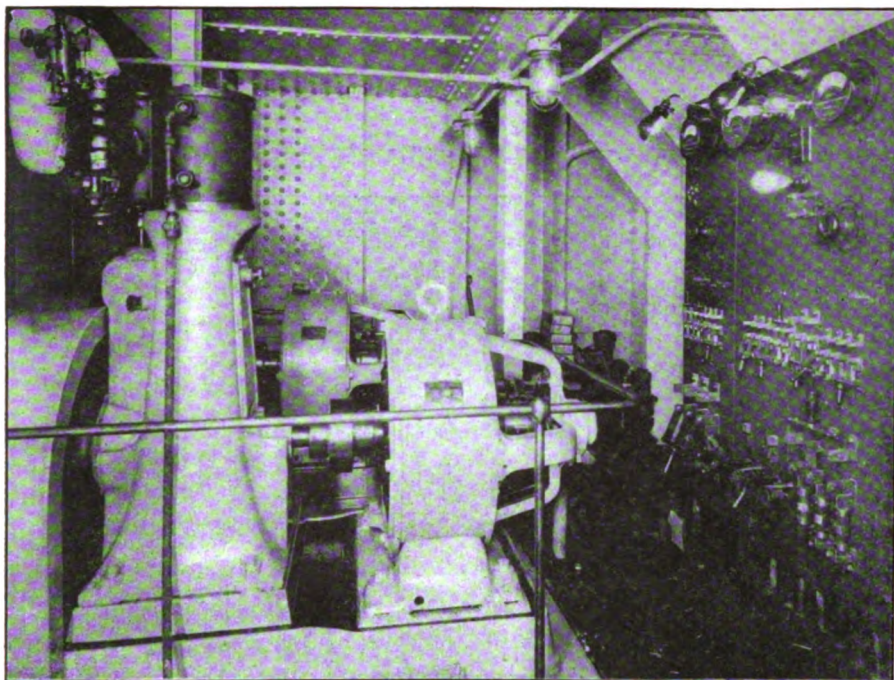
The carriage raising and lowering mechanism is operated by power or hand, the driving gear being equipped with a limited torque clutch to secure safety to the mechanism in case the carriage is clamped too hard to the column when the power drive is thrown into gear. A steel scale on the face of the column indicates the distance from the top of the table to the center of the spindle and a corresponding scale is carried by the outboard column.

Drilling Attachment Cuts Square Holes

A drilling attachment designed to drill square holes in solid material without previous machining has been developed by the Fairbanks Co., New York. The device, which is based on the principle of the Cardan circles, consists of a specially ground drill with cam-shaped shank and a leader or guide in a head. In Fig. 1, the line 1-2-4 represents a cross section of the shank of a drill which is rotated inside of a square guide, indicated by the outside line. The cutting edges of the drill, which are ground on the end as indicated in Fig. 1 and shown in Fig. 3, sweep across the surface of a square



HORIZONTAL DRILLING MACHINE WITH PLANER TYPE BED ESPECIALLY ADAPTED FOR MARINE WORK



SELF-CONTAINED MARINE LIGHTING OUTFIT

having rounded corners. Hence, when the drill is fed into the material it cuts a square hole with filleted corners. In order to make a hole with sharp corners, a shank whose cross section is represented by 1-2-3-4, Fig. 2, is used. One cutting edge, which is longer than the others, sweeps into the corners, squaring them.

The drill is positively driven from the spindle of the machine to which it is attached and the cutting lips follow a path determined by the adjustable jaws of the head. No preliminary hole is necessary and the cutters are designed so that blind square holes can be drilled in one operation without any subsequent finishing. The drills are manufactured in two styles, one being designed for cutting holes with filleted corners, and the other for die work in which the corners are sharp. The heads or chucks are made in four sizes in order to accommodate drills ranging in size from $\frac{1}{8}$ to 2 inches. Fig. 3 shows the attachment on a horizontal milling machine cutting square holes with filleted corners.

Lighting Outfit

The lighting outfit shown in the accompanying illustration is a recent development of the Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa. It is made in several sizes ranging from 2 to 50 kilowatts. The outfit illustrated is installed on the NEW BRITTON, a 7600-ton vessel, and consists of two upright engines built by the Clarage Fan Co., driving two Westinghouse generators.

Each set consists of an engine and generator mounted on a bed plate so as

to form a compact unit. The outfit illustrated is 6 feet long, 3 feet wide and 5 feet high. It weighs approximately 3300 pounds. The engine is a single cylinder vertical unit, enclosed V-type, provided with automatic lubrication. It can be supplied with steam ranging from 80 to 250 pounds to the square inch. It is suitable for condensing or noncondensing operation. Engine speeds range from 500 in the smaller sizes to 350 revolutions a minute in the larger sizes.

The generator is especially designed for marine service. The bearings are so arranged that ample lubrication is assured, regardless of how the vessel pitches or rolls, while the windings are specially insulated to protect them from salt and dampness. Metal parts subject to corrosion are made of noncorroding alloys. A special feature of these generators, it is pointed out, is their freedom from commutator sparking, even

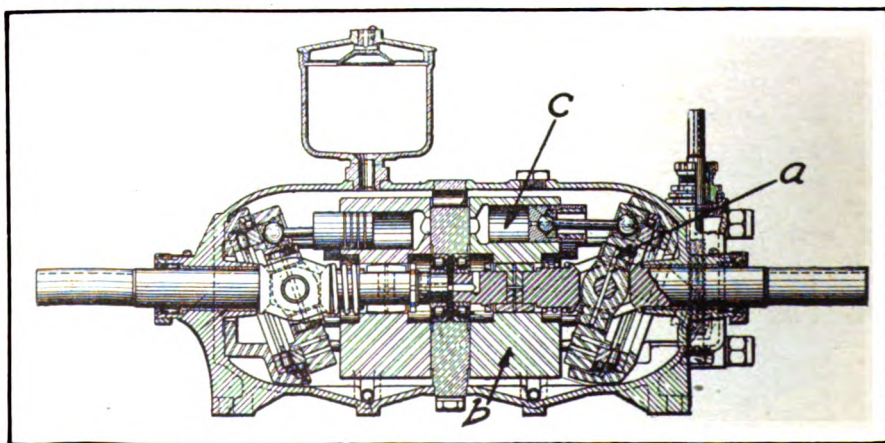
when under heavy loads. They are supplied for 125 or 250 volts, direct current, and for either 2 or 3-wire systems.

Develops Novel Hydraulic Reverse Gear

An interesting hydraulic speed gear mechanism for transmitting power from an engine to a propeller shaft or to any other ordinary load where changes of speed or direction are desired, has been developed by the Waterbury Tool Co., Waterbury, Conn.

As indicated in the accompanying illustration, the mechanism consists of an oil pump mounted on the driving shaft while an oil engine is mounted on the driver shaft. The operation depends upon a tilting ring shown at *A*, which is fastened to the driving shaft in such a way that it may be tilted in either direction or may be locked in a perpendicular plane known as a neutral point. Fastened to this ring are nine small piston rods which actuate pistons in the block cylinder shown at *B*. When the tilting ring *A* is in its perpendicular position there will be no movement in and out of the small cylinders, one of which is indicated by *C*. However, as the ring is tilted in either direction, these cylinders start to pump and the oil which they displace drives other pistons in a corresponding cylinder block and which actuate the tilting ring on the driven shaft.

As the first tilting ring *A* is tilted further from the vertical, the pistons will have a resultant greater movement and therefore more oil will be pumped. Similarly on the engine side as more oil is displaced by the pump, the driving cylinders must move faster to take care of it; therefore the driven shaft must revolve at a higher speed. When both tilting rings are tilted at the same angle, assuming no oil is lost in transmission, the driven shaft revolves at the same speed as the driving shaft. Oil, being almost noncom-



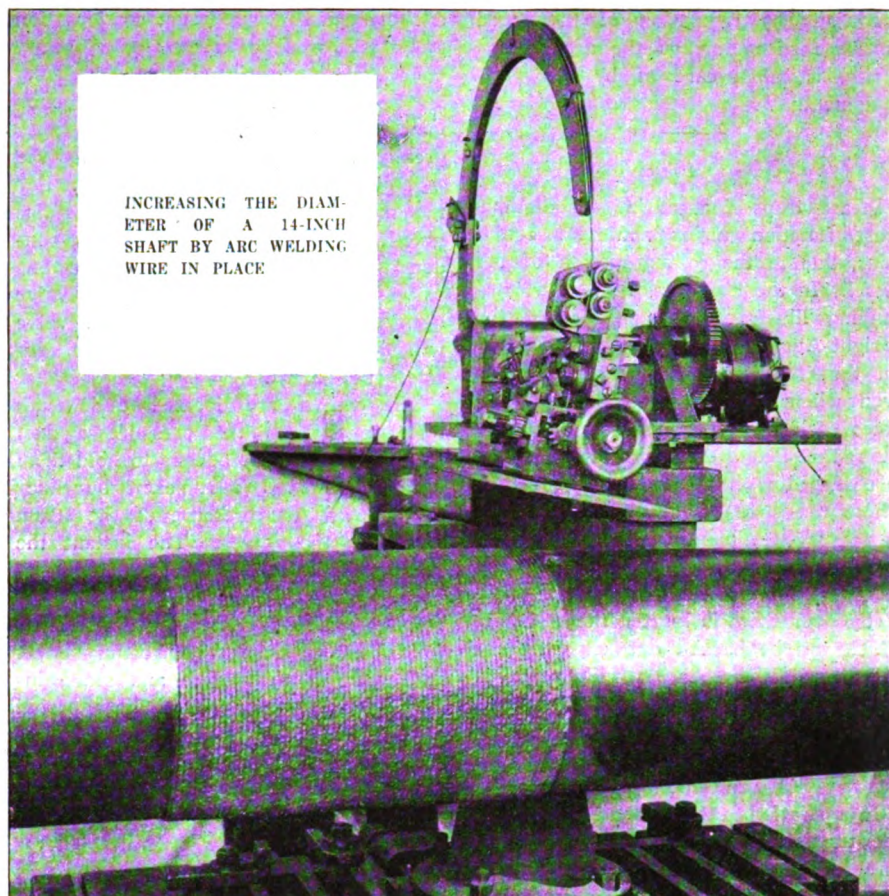
REVERSING GEAR IN WHICH POWER IS TRANSMITTED BY MEANS OF OIL IN NINE CYLINDERS

pressible, has to circulate through one set of cylinders at the same rate as the other and having the same piston movements in both cases, the piston speeds would be the same. If, however, the tilting ring on the driven side were not tilted as far as that on the driving side, the oil displaced by the driving pistons would not have as much room in the cylinders of the driven side and would therefore have to move these cylinders faster than the movement of the first set of cylinders. From this, it may be seen that almost any relations of speeds between the driving shaft and the driven shaft may be secured by the proper relative movement of the two tilting rings. Reversal of the engine is obtained by tilting one of the rings into an opposite direction from the other which changes the direction of flow of oil through the ports.

Water Heater

The accompanying illustration shows a water heater recently developed by the Griscom-Russell Co., New York. This unit is said to be especially adapted for marine installations as it takes up a minimum amount of space. The shell, water heads and floating head cover are cast iron, the tube plates are rolled steel and the tubes are seamless brass units, expanded into the tube sheets. To make allowance for expansion and contraction of the tubes under heat, one tube plate is attached firmly to the shell while the other is free to move. This reduces strain on the tubes. The shell is designed to withstand a working pressure of 50 pounds to the square inch while the tubes and water chambers are proportioned for a pressure of 250 pounds to the square inch.

In operation, the water passes through the tubes and is heated by the exhaust or live steam in the shell surrounding the tubes. It is pointed out that it takes but a few seconds for the passage



of the water current through either the two, four, six or eight passes in which the tube bundles are arranged. In this time the water is heated to the desired temperature.

It is said that the heater can be operated in excess of its rated capacity with only a slight reduction in the temperature of the heated water. Interior arrangement is clearly shown by the illustration.

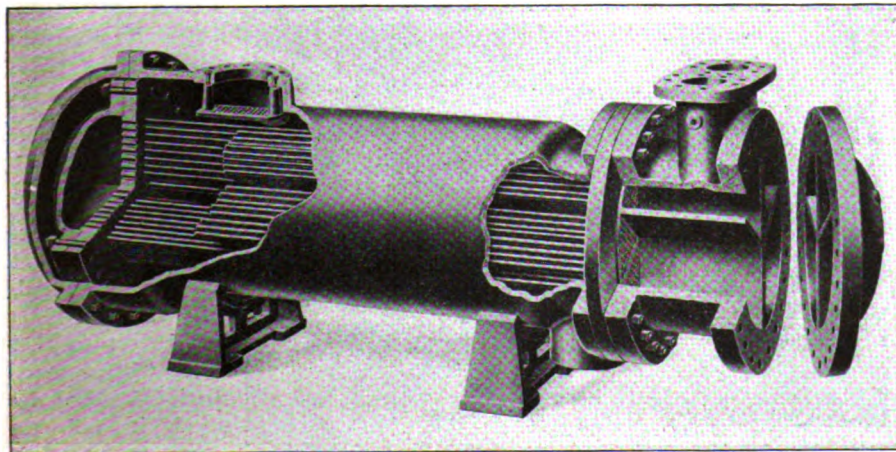
Arc Welder

Among the many operations for which a new automatic arc welder, designed by the General Electric Co., Schenectady, N. Y., can be utilized, is increas-

ing the size of shaft diameters or rebuilding worn or imperfectly turned shafts. In the accompanying illustration, 38-inch stock is being added to a 14-inch shaft.

Designed for use with a regular arc welding set, this device takes the place of the hand controlled electrode. It consists of a pair of feed rollers, driven by a small direct current motor, which draw in and deliver to the arc a steady supply of wire, automatically maintaining the correct working distance. The welding head consists of a steel body carrying feed and straightening rolls, both of which are adjustable for various sizes of wire. Gears which give three gear ratios are in a gear box. The gear box, together with the motor, supports the arm. Thus the range of the device is extended and the motor is allowed to operate at its most favorable speed.

The device is controlled from a small panel, which carries an ammeter and voltmeter for the welding circuit, as well as rheostats, a control relay, and the contractors and switches for the feed motor. While it is possible to start and stop the equipment from the work by a pendant push button, adjustment of the feed conditions must be made from the panel. Increased welding speed is attained by reason of the fact that a practically steady arc is obtained, since the adjustment for arc



QUICK ACTING WATER HEATER FOR MARINE INSTALLATIONS

conditions by regulation of the speed of the feed motor, as the arc voltage varies, is taken care of by the panel equipment.

Marine Steam Trap

Steam traps for marine installations must function under abnormal conditions, due to the rolling motion of the vessel. In the trap shown in the accompanying illustrations, a product of the Wright-Austin Co., Detroit, it is pointed out that the device works satisfactorily even when the ship is rolling 35 degrees each way from an even keel.

As the illustration shows, this trap is equipped with three discharge valves. These are steam tight and are located at the highest point of the trap, away from grit, scale, sediment, etc. The valves and seats are monel metal. Directly over them is located the test plug which can be backed out, exposing the valve seats. These are readily removed with a screw driver. If desired, all the working parts can be removed simply by lifting off the cover, without disturbing any pipe connections or lagging.

In operation, the condensation enters the trap, filling it to about the center and forming a seal of from four to six inches of water at both inlet and outlet. This prevents waste and escape of steam. When thus filled, the float rises, opening the three valves in succession. Ordinarily, but one valve is required to handle the volume of condensation, the two other valves acting as reserves for emergencies. It is said that the action of the trap in emergencies is instantaneous and that the discharge from each of the three valves is continuous. Should any emergency at sea so require for the purpose of keeping up steam or otherwise, the standard trap is interchangeable on heating systems, coils, fuel oil heaters, high pressure drips, etc., without any change of parts. No adjustments are needed for any kind of working pressure. In all trap service, the company points out, two distinct conditions are found,

a short cycle of maximum condensation and a long cycle of normal or minimum condensation. Efficient trap capacity must be provided for the emergency load which compels the trap to operate greatly below its capacity during the long cycle of reduced condensation. For the minimum load, one valve remains practically wide open. If more condensation comes to the trap than one valve can handle, then the second valve opens and, if required, the third valve will open. All three valves open for emergency loads.

The valves are located underneath their seats with the pressure against them. This has a tendency to hold them until the float has sufficient buoyancy to overcome the pressure of the steam and open the valves. The instant the pressure is released, the float naturally rises higher which action opens the valve practically wide. This design is followed to reduce the throttling effect and wear on the valves and seats, insuring tight valves for a long period of operation.

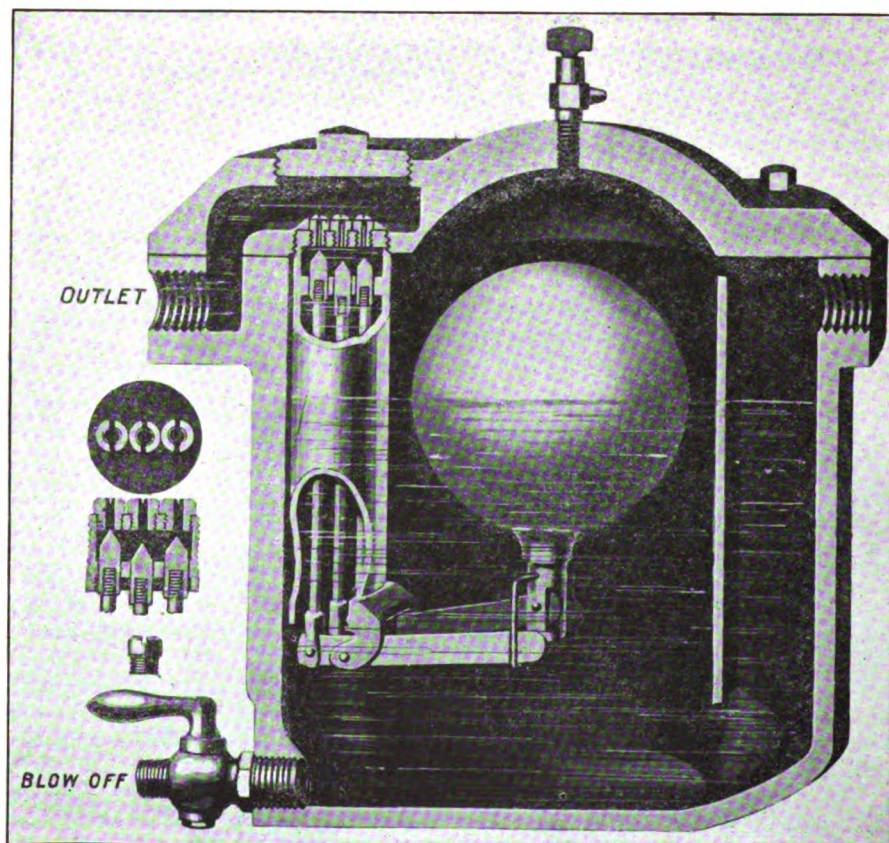
Among the marine users of these traps are the American Shipbuilding Co., Cleveland; Bethlehem Shipbuilding Corp., Bethlehem, Pa.; Detroit & Cleveland Navigation Co., Detroit; Great Lakes Engineering Works, Detroit; Merchant Shipbuilding Corp., Bristol, Pa.; Newburgh Shipyards, Inc., Newburgh, N. Y., and other well known shipbuilders and vessel operators.

Heavy Duty Gang Drill

Built for heavy duty work in marine machine shops, such as heavy drilling and boring, the 3-spindle, 26-inch, sliding head gang drill, recently produced by the Barnes Drill Co., Rockford, Ill., has eight changes each of geared speeds and feeds on each spindle. These speeds run from 23 to 230 revolutions per minute and feeds from 0.005 to 0.075-inch. The double splined spindles, which are independent of each other, are under the operator's instant control from the front of the machine. The sleeve has a 14-inch travel and the drift hole is below the sleeve.

The steel crown and pinion gears are cut 4-pitch and are of 10 $\frac{1}{2}$ and 5-inch diameter, respectively. The head and spindle are counterbalanced, the weight being suspended by a roller bearing sheave wheel. The other sheave wheels are accessible to oil. Alignment is assured as the head is gibbed to the column face and is held at any point within the long travel by two quick-acting clamp screws. A pinion, actuated by a crank handle, operating in a rack raises and lowers the head easily which feature is particularly desirable for boring bar and deep-hole work. An adjustable stop is provided to clamp on the column face so that the sliding head may be instantly brought back to the same location each time the head is raised. Multiple disk friction clutch

gears, giving a reverse speed of 1 $\frac{3}{4}$ to 1, are on the driving shaft of the machine instead of on the spindle. This, it is pointed out, eliminates excessive wear and tear of the clutches. Any or all spindles can be supplied, with an automatic reversing mechanism, which is desirable for tapping. The trip can be set so that the instant the tap reaches the desired depth, the spindle will reverse automatically, backing out the tap at an increased speed. The shifting lever can be set so that when tripped automatically, or by hand, it will return to neutral, which stops the

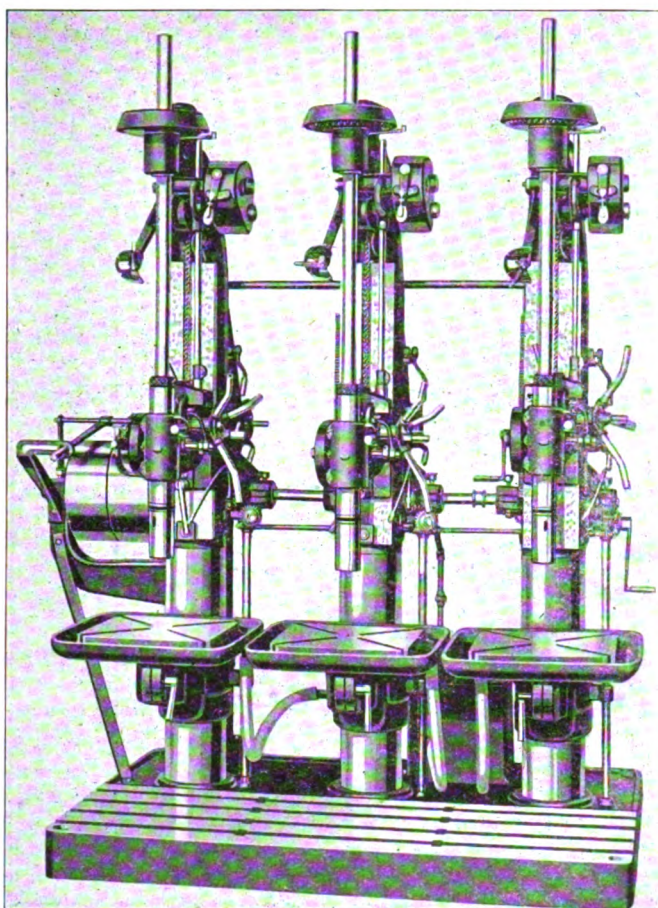


MARINE STEAM TRAP WITH THREE VALVES

spindle instantly instead of reversing it. The drill, as shown in the accompanying illustration, stands 94 inches high and occupies a 49 x 70-inch floor space, exclusive of the tight and loose pulleys which overhang 16 inches. The platen travels 20 inches vertically and the sliding head travel is 23 inches.

Boiler Tests

Early in 1918, F. W. Dean, of the Emergency Fleet corporation, requested the bureau of mines to furnish the personnel and equipment to make determinations of the temperatures existing in the gases throughout the setting of a boiler. This was to be done in connection with a boiler test which the corporation was conducting at Erie, Pa. O. P. Hood was in charge of the test and Henry Kreisinger was detailed to make the determinations. The results obtained clearly indicated the necessity for further work on the problem of boiler efficiency. The fact is not



THIS 3-SPINDLE, 26-INCH, SLIDING HEAD GANG DRILL IS FITTED WITH SQUARE PLATENS AND AN OIL PUMP—IT IS PARTICULARLY ADAPTED FOR MARINE WORK

generally appreciated that sufficient air cannot be admitted through the fuel bed of a hand-fired furnace to provide for complete combustion. This fact is independent of the kind of fuel used or the rate at which air passes through it. Unless there are holes in the fuel bed through which the air passes without coming in contact with the fuel, there is always 20 to 32 per cent of combustible gases with no free oxygen to burn it. This fact is generally overlooked, because in ordinary furnace practice there are so many holes in the fuel bed and so many leaks around the furnace doors and in the boiler setting that an excess of air commonly exists in the flue gases. In other words, two errors compensate for each other so that the existence of one is masked. The air which leaks into the furnace, however, does not usually serve the purpose of bringing about complete combustion of the fuel, because it is not properly mixed with the combustible gases.

Business News for the Marine Trade

The Metropolitan Marine & Fuel Co., Boston, recently was incorporated with \$1,000,000 capital, by E. P. Carver Jr., Charles L. Hadley, Melrose, Mass., and A. J. Plummer.

A contract for erecting a boiler house to be built at an estimated cost of \$20,000, recently was awarded by the Simpson Patent Dry Dock Co., Boston.

Erection of a machine shop, at an estimated cost of \$35,000, is contemplated by the Todd Shipyard Corp., Brooklyn, N. Y.

The New York Harbor Dry Dock Corp., New York, has been incorporated to construct drydocks, etc., with \$8,000,000 capital, by T. L. Croteau, M. A. Bruce and S. E. Dill.

The Aeme Fishing Tool Co., Parkersburg, W. Va., is reported planning to erect a 1-story boiler house. The Elizabeth City Iron Works & Supply Co., Elizabeth, N. C., is reported planning to erect a shipbuilding and repair plant, at an estimated cost of \$100,000.

Bids have been taken by the Bethlehem Shipbuilding Corp. for erecting a shipbuilding slip and bulkhead at Quincy, Mass.

Capitalized at \$30,000, the Port Washington Shipyard & Motor Co., Port Washington, N. Y., recently was incorporated by A. Walker, E. V. Will's and F. M. Caughey.

The Globe Shipbuilding Co., Baltimore, contemplates the erection of a new plant at Fairfield, Md.

The plant owned by the St. Lawrence Welding Co., 138 Inspector street, Montreal, Que., recently was

damaged by fire. The loss was estimated at \$35,000.

John, James A. and John Z. Rourke, Savannah, Ga., recently incorporated the Rourke Dry Docks Co., with a capital stock of \$50,000.

The Chickasaw Shipbuilding & Car Co., Birmingham, Ala., is reported planning to build a plant for the manufacture of steel cars and frames.

The Birmingham Steel Corp., Birmingham, Ala., is reported considering the establishment of additional facilities for manufacturing ship and steel shapes.

The Mobile Shipbuilding Co., Mobile, Ala., has announced its present capacity will be increased from 25 to 40 per cent.

The St. Andrew's Bay Ways Co., St. Andrew, Fla., has been organized to construct shipways. A 200-foot cradle is planned.

The Dominion Shipbuilding & Repair Co., Ltd., Toronto, Ont., has been incorporated to build ships, etc., with \$3,000,000 capital, by Norman S. Robertson, 44 King street; Harold L. Steele, 437 Broadway avenue, and others.

Plans have been drawn for erecting a foundry at Charlestown, Mass., for the Crosby Steam Gauge & Valve Co., Boston.

The Bartlett Navigation Co., New York, recently was incorporated with \$20,000 capital, by H. L. Rhoades, L. H. Healy and D. C. Kraemer, 179 Eighth avenue, Brooklyn, N. Y.

The Submarine Boat Corp., Newark, N. J., contemplates the development of its shipbuilding plant and the establishment of a large terminal. The improve-

ments will include the construction of drydocks and a large ship repair plant.

The bureau of yards and docks, navy department, will erect a pattern shop at Portsmouth, Va. The cost of the project is estimated at \$389,000. The contract has been let.

Capitalized at \$10,200, the R. & R. Marine Supply Co., Ashtabula, O., has been incorporated by J. A. Schultz, T. C. Robinson and T. H. Duncan.

The Chris. Rehkopf Boiler & Tank Works, Memphis, Tenn., plans to establish a boiler and tank works. W. W. Foley is an officer of the company.

The Maritime Boat & Engine Co., Seattle, contemplates the erection of a large frame structure, 68 x 70 feet.

W. J. Wright, Le Roy Vanderburgh and Selma Salmansohn were named as the incorporators of the Atmo Signal Corp., Hackensack, N. J., which was recently chartered with \$200,000 capital, to manufacture signal systems, etc.

The Oklahoma Engine, Machine & Boiler Co., Muskogee, Okla., is reported planning the erection of a machine shop.

The capital stock of the Havana American Steamship Corp., New York, recently was increased from \$1,000,000 to \$3,000,000.

The Bayles Shipyard, Port Jefferson, Long Island, N. Y., has been sold by the shipping board to A. R. Allen, New York, for \$2,000,000.

Capitalized at \$1,000,000, the Porto Towing & Export Co., recently was incorporated at Wilmington.

Del., to build and operate boats, by Franklin L. Mettler, M. E. Mettler and L. F. Mettler.

B. W. Longheed & Sons, New York, recently were incorporated with \$10,000 capital, by J. L. Clare, S. Cohen and L. Moed, 11 Broadway, to engage in business as ship brokers.

The Western Shore Transportation & Exchange Corp. has been incorporated with \$500,000 capital, to build and operate boats, etc., by Alexander M. Jackson, George W. Nealey, Salisbury, Md.; L. C. Quinn and others of Christfield, Mass.

The Marine Ship Chandlery Co., New York, has been incorporated with \$10,000 capital, by M. Roger, W. C. McCreery and W. H. Gillon, 1246 Pacific street, Brooklyn, N. Y.

The Honolulu Steamship Co., New York, has been incorporated to build and operate boats, vessels, etc., with \$500,000 capital, by Henry P. Molloy, F. X. Hennessey and Wallace Ingraham.

Capitalized at \$6,000,000, the Ukrainian Navigation & Trading Corp. recently was incorporated at New York, to build, own and operate vessels of all kinds, by Theodore L. Ernst, J. Meehan and H. I. Ellis Jr.

P. V. Gioe & Co., New York, have been incorporated as ship agents, by P. V. Gioe, W. A. Sweet and J. M. Mangiere, Eighty-third street and Nineteenth avenue, Brooklyn, N. Y.

The Boland & Cornelius Steamship Co., Williams-ville, N. Y., has been incorporated with \$50,000 active capital, by J. J. Boland, A. E. Cornelius and G. C. Martin, all of Buffalo.

The Oriental Navigation Co. has been incorporated with \$40,000 capital, to build and operate boats, etc., by F. W. McGovern, Chicago, T. L. Croteau and H. E. Knox, Wilmington, Del.

T. L. Ernst, L. S. Dumensil and J. Mellon, all of New York, were named as the incorporators of the Grenan Steamship & Trading Corp., which was recently chartered with \$1,000,000 capital.

The Alpha Towing & Transportation Co., Jersey City, N. J., has been incorporated to operate a towing and transportation business, with \$50,000 capital, by Robert Wigton, C. J. Shull and H. S. Mangin, all of Philadelphia.

G. Cohen, J. E. Malino and B. B. Mead, 1999 Washington avenue, New York, were named as the incorporators of the Columbia Dredging Corp., New York, which was recently chartered with \$100,000 capital.

The Glendola Steamship Corp., New York, recently was incorporated with \$800,000 capital, by H. Victor Crawford, I. W. Boner and John W. Crandell.

S. B. Howard, George V. Relly and Robert K. Thistle are the incorporators of the European Steamship Line, Inc., New York, which was recently chartered with \$150,000 capital.

The Thames River Line, Inc., recently was incorporated with \$85,000 capital by H. E. Knox, S. E. Dill and others of Wilmington, Del.

The Buckeye Steamship Co., New York, has been incorporated with \$400,000 capital, by Daniel S. White, Richard C. White and Charles A. MacDonald.

Capitalized at \$50,000,000, the Union Oil Steamship Co. recently was incorporated by M. L. Rogers, L. A. Irwin and W. G. Singer, Wilmington, Del.

The Marine Repair Corp., Brooklyn, N. Y., recently was incorporated with \$100,000 capital, by R. Graff, J. R. Tinkler and J. A. Archung, 5423 Second avenue.

W. F. O'Keefe, George G. Steigler and E. E. Aberlee, Wilmington, Del., have been named as the incorporators of the Manufacturers' Steamship Co., which was recently chartered with \$100,000 capital.

The Harbor Service Corp., New York, general contracting, has been incorporated with \$5000 capital, by E. W. Leavenworth, H. W. Dieck Jr. and W. C. Pyne, 152 West 105th street.

Capitalized at \$100,000, the Imperial Commerce Corp., New York, shipping and forwarding, recently was incorporated by F. J. Sullivan, A. H. Brill and G. Searing, 1537 Lurting avenue.

T. L. Croteau, C. H. Blaske and S. E. Dill, Wilmington, Del., have been named as the incorporators of the Yacht Repair & Storage Co., which was recently chartered with \$100,000 capital.

To build and operate boats, vessels, etc., the Osage Steamship Co., Ltd., Wilmington, Del., recently was incorporated with \$1,000,000 capital.

The Croton Water Co., ship chandlery, New York has been incorporated with \$50,000 capital, by

I. Bergoff, P. F. and W. H. Anderson, 22 East Sixteenth street, Brooklyn, N. Y.

The capital stock of the Black Star Line, New York, recently was increased from \$500,000 to \$10,000,000.

Finn, Hannevig & Co., New York, ship chandlery, has been incorporated with \$50,00 capital, by F. Hannevig, A. Maco-Barnes and T. Neilson, 22 South Portland avenue, Brooklyn, N. Y.

Simondetti & Co. has been incorporated in Delaware, to do exporting and importing, with 1000

shares of preferred stock, \$1000 each, and 2000 shares of common stock, no par value. E. P. Pierce Jr., 19 West Forty-fourth street, New York, represents the company.

The Kewanee Boiler Co., Kewanee, Ill., is erecting two additions to its plant. One is a boiler shop, 130 x 750 feet, and the other a foundry, 80 x 390 feet. These additions, when completed, will increase the company's boiler making capacity 50 per cent. The new buildings are expected to be ready for occupation about June 1.

The East Coast Fisheries Co., Rockland, Me., has plans for the expenditure of \$1,400,000, during 1920 for improving its facilities. The company expects to have 25 steam trawlers in operation shortly, all landing their cargoes at Rockland. Part of the new construction planned is a \$500,000 by-product plant, 12 warehouses with a capacity of 100,000,000 pounds of fish, docks for 10 steam trawlers and a \$100,000 marine railway.

The John Chisholm Fisheries Co., Gloucester, Mass., has been incorporated under the laws of Massachusetts, with \$500,000 capital, to engage in general fishing, etc.

The Shawmut Steamship Co., Boston, recently awarded a contract to the Merchant Shipbuilding Co., Chester, Pa., for the construction of two large freight steamers. The vessels will be about 450 feet long, with a deadweight capacity in excess of 10,000 tons. They will be turbine driven oil burners with a speed of 13 knots.

Capitalized at \$25,000, the Coastwise Sealing Co. recently was incorporated at Boston to scale and repair vessels, by John J. Boyden and others.

The Marine Products Co., Augusta, Me., has been incorporated with \$125,000 capital, by George H. Rausch and others.

New Trade Publications

TIDE CALENDAR.—The Kelvin & Wilfrid O. White Co., Boston, recently issued a tide calendar for New York and Boston, showing morning and evening tides throughout the year. The tables are arranged in the form of an ordinary calendar and give the time of high water, low water, height of tide, sunrise and sunset. A list of other seaport towns along the Atlantic coast is also given showing the difference in time of high water at Boston and the ports designated.

CAR DUMPERS.—An attractive booklet describing car dumpers as used in unloading bulk materials in industrial plants recently was issued by the Wellman-Seaver-Morgan Co., Cleveland. The booklet is well illustrated, showing the car dumpers under actual working conditions. Reproductions of blue prints also are included. These show a movable and a tandem car dumper. The car dumpers are used for discharging the contents of open-top railroad cars by inverting the car sidewise and dumping its contents into boats, bins or storage yards. The device which is fully described in the booklet, consists of a rectangular framework supporting a rotating cradle in which the loaded railroad car is held while discharging. An automatic counterweight device is used to clamp the car to the cradle which is inverted with the revolving mechanism, carrying the car with it.

FUEL OIL INSTALLATIONS.—With the object of giving prospective users of fuel oil a practical knowledge of the factors governing the installation and operation of oil burning plants, the Standard Oil Co., New York, recently issued a 112-page, profusely illustrated booklet in which the subject is treated in an exhaustive manner. The numerous illustrations show typical installations while many line drawings and charts give valuable data. Of interest to shipping men is the list given of the company's fuel oil bunkering stations throughout the world. The booklet is divided into eight sections as follows: Fuel oil and its properties, advantages in the use of fuel oil, fuel oil burners and methods of atomization, equipment required in oil burning systems, oil burning boiler plants, special applications of oil burning installations, results of boiler tests when burning fuel oil and a number of tables of interest to users of fuel oil. The booklet is interestingly written and will prove of value to engineers and others directly interested in oil as a fuel.

Business Changes

The Plant Engineering & Equipment Co., New York, has opened an office at Newark, N. J., in charge of M. William Ehrlich.

The Tacony Steel Co., Philadelphia, has opened a Chicago sales office in the Marquette building. Frank B. Hillwick is in charge.

The Electrolabs Co. now has its main offices at 2635 Penn avenue, Pittsburgh. The company's offices formerly were in New York where a branch office is still maintained at 30 Church street, room 313.

Lykes Bros., steamship agents, New York, have opened a branch office in Beaumont, Tex., where they will handle their own vessels in the lumber trade from that port.

The Titusville Forge Co., Titusville, Pa., has established a branch office in New York at 111 Broadway.

The Black & Decker Mfg. Co., Baltimore, has established an office and showroom at 1436 South Michigan avenue, Chicago, in charge of R. G. Ames.

The Green Star Steamship Corp. and the Cosmopolitan line now have a combined traffic department at 42 Broadway, New York.

Samuel L. Taub and R. J. Taub have opened an office at 21 Park Row, New York, where they are transacting a contracting and forwarding business under the name of the Taub Shipping Co.

Irving Cooper and Samuel Price have established a forwarding business at 74 Cortlandt street, New York, under the name of Price-Cooper, Inc.

William H. Miller & Co., Inc., Rotterdam, have opened an office in the Produce Exchange Annex, New York, to handle their own vessels and act as agents, chartering brokers, etc. The company has offices in the principal European ports.

John Hazap's and A. S. Hazap's have established an office at 68 Broad street, New York, where they will conduct a shipping business.

A. T. Shurick has been elected vice president of F. C. Thornley & Co., Inc., New York, designers and builders of material handling equipment.

F. C. Thornley & Co., Inc., recently moved into new office quarters at 31 West Forty-third street, New York. The company designs and builds material handling equipment.

The Lloyd Royal Belge recently opened an office in New Orleans in the Maison Blanche building in charge of Fred G. Gysen. The company is now operating a line of steamers between New Orleans and Antwerp.

The Heppenstall Forge & Knife Co., Pittsburgh, announces the appointment of Drummond, McCall & Co., Ltd., Montreal, Que., as selling agents for its product in the Montreal district. This firm also will handle in the Montreal district the products of the Heppenstall Forge Co., Bridgeport, Conn.

Th Ward Tool & Forging Co., Latrobe, Pa., punches, dies, reamers, tools and forgings, announces the appointment of W. R. Keene & Co., 90 West Broadway, New York, as its sales representatives in the New York district, of J. M. Hamilton & Co., Land Title building, Philadelphia, in that district and of the Edwin-Earle Sales Co., 105 Wood street, Pittsburgh, to represent it in the Pittsburgh district.